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MINING AND SCIENTIFIC PRESS.

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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVI. — Number 1.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JANUARY 7, 1893.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

Sectional Water-Jacket Furnaces.

When carbonates of lead or copper or metallic copper ores contain a sufficient percentage of those metals to smelt without the addition of any other flux, their treatment in the water-jacket smelting furnace is the simplest possible form of smelting, sometimes requiring nothing but fuel and ore. Frequently the percentage of metals is too low to smelt, or the ores may contain copper pyrites and glance and galena. In preparing the last-named ores for the furnace, miners are met with the complex side of the smelting process; mixtures of iron ore, limestone or silica are found necessary, and to determine when they are required, and how much of each must be added to the ores, is the problem that must be solved to work these ores successfully. It often happens that ores of a different character are at hand, which flux each other to a great extent, in which case they are mixed together as required and then the necessary flux added.

The cut on this page shows a galena silver-smelting furnace, with water-jacket rectangular in form, built in sections and capable of being extended, so as to give a daily capacity of sixty tons of ordinary smelting ore. These smelters have been quite generally adopted by the best reduction works in the East, and are found to give excellent results. The regular sizes are 36 by 42 inches, and from that up to 36 by 78 inches, though special sizes are also built to order by the Risdon Iron Works of this city.

A REDUCTION in the wages of miners is announced to take place in some of the large mines of Utah. The mine-owners of Bingham say that on account of the low price of silver not only must the miners' wages be reduced, but railroad and smelting rates must be lowered; otherwise, they will be compelled to close down. The owners of mines in Tintic tell the same story, and unless something is done to appreciate the price of silver, a general reduction of wages or shut-down of the mines will take place in Colorado, Idaho, Utah and Nevada.

THE North Star Mining Company, of Grass Valley, has recently declared and paid a \$50,000 dividend. This makes the eighth dividend declared by the present company, making an aggregate of \$400,000. The seventh dividend was declared a year ago. The North Star is reported to be looking very well at the present time, making the prospects good for future dividends.

THE Champion Mining Company, Nevada Co., has made arrangements for the erection of new hoisting works soon, to be put up in place of the present works, which are to be placed on the old Merrifield mine, that property being owned by the Champion Company. The change of machinery, etc., will not seriously interfere with operations in the mine.

THERE is a gold excitement in the Wichita mountains, about 75 miles southwest of El Reno, Oklahoma. The new El Dorado lies within the forbidden territory belonging to the Kiowa and Comanche Indian reservation.

COLORADO, in looking out for something to mine in addition to silver, thinks its mines of asbestos are richer than those of Wyoming, and wants some one to start in and work its deposits.

ACADEMY OF SCIENCES.—At the annual meeting of the California Academy of Sciences, held Tuesday evening, the following officers were elected to serve during the present year: President, H. W. Harkness; first vice-president, H. H. Bahr; second vice-president, J. G. Cooper; corresponding secretary, T. S. Brandegee; recording secretary, J. R. Scupham; treasurer, L. H. Foote; librarian,

The State Power House.

The State Power House lately completed at the Folsom Prison is a massive structure of solid granite masonry. It is 170 feet long, 72 feet wide, and 28 feet high in the clear. It is situated about 206 yards below the dam of the Folsom Water Power Company. It is here the State will receive return for the labor furnished in building the great dam and canal. This latter was built for the Folsom Water Power Company by convict labor, and the State is entitled to an aggregate of 800 horsepower. This will be utilized for electric lighting, about the shops, and in the factories and mills likely to be established later by the State.

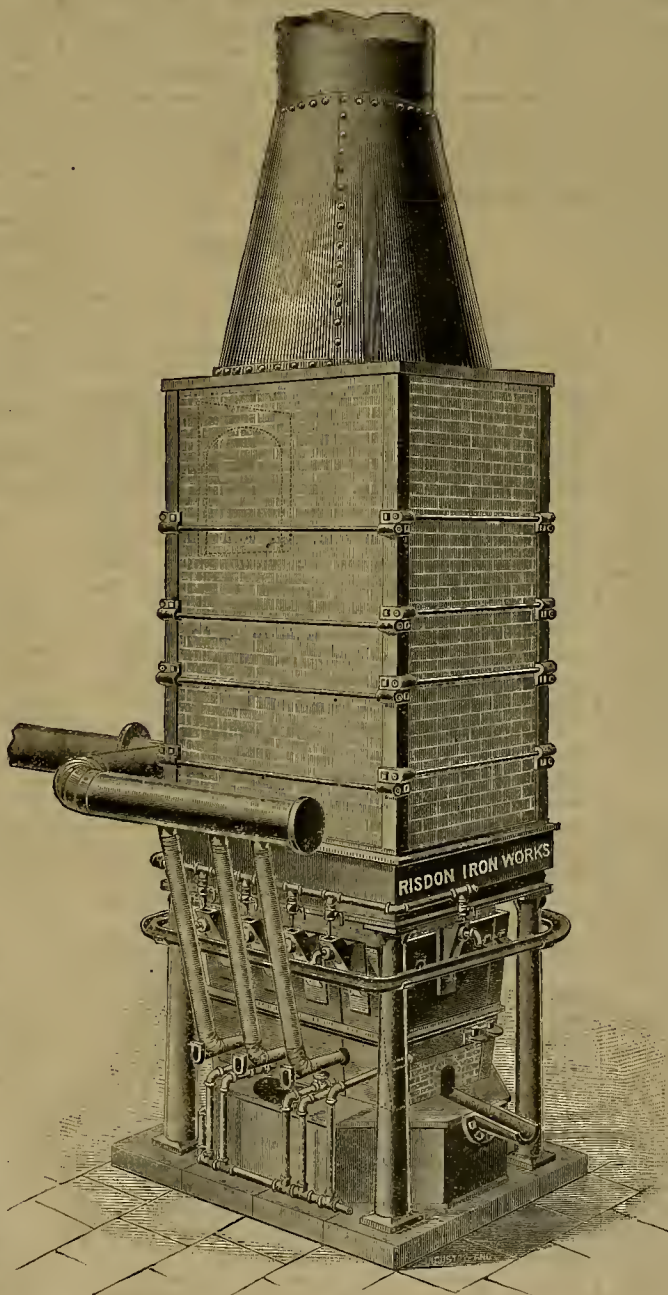
The power is caught up by six 87-inch Leffel Turbine wheels, which, running at full capacity, give each 134 horsepower. From the bed of the canal to the bed of the tailrace the fall is eight feet. At present there will be one duplex compressor of 180 horsepower, and one 3-throw irrigation pump with a capacity of 1000 gallons a minute. This latter will furnish water to a large reservoir on the high ground for general ranch, orchard and garden purposes. The power furnished by the compressor will be used by the engines and Ingersoll drilling machines for quarry work, and steam will be entirely dispensed with. All the great watergates about the dam and power house, aggregating 20 in number, will be lifted by hydraulic force. This is generated by a 3-throw hydraulic pump which forces the water from the canal, under the accumulator. This latter is a huge iron box 5 feet in width and 10 feet in length and height; within it is a 12-inch piston carrying a weight of 60 tons, which is lifted to a height of 10 feet by water from the hydraulic pump. This, together with the irrigation pump, was furnished by the Risdon Iron Works of this city. The great compressor was built by the Union Iron Works. The turbines are placed longitudinally in the power house and geared to a single shaft from which the power is transmitted to the compressor, by rope belting.

The water to the turbines enters through six double arches the width of the canal being equal to the length of the power house. To guard against the accumulation of slickens in the canal a hydraulic jet is so placed as to sweep across the canal and flush it free of the slickens that would otherwise gather before the turbine gates. Escape gates are conveniently arranged along the canal, which will also aid in flushing.

It is expected to have the machinery in place and everything in readiness for producing power by the middle of January. The work has been done under the general management of Mr. Chas. Aull, the warden. The actual work of construction of the power house and the placing of machinery has been under the superintendence of Mr. Chas. Matheson, who some years ago supervised the sinking of the combination shaft at Virginia City, by which work he is known to

many mining men. The State has one more section of canal to build below the power house, and its work in this regard will then be done. The Water Power Company will complete the canal to Folsom, at which point it will have its own plant, from whence it will derive power for the intended sawmills and transmit the surplus to Sacramento.

MINING companies having offices in this city paid \$135,250 in dividends in December.



CAST IRON SECTIONAL WATER-JACKET SMELTING FURNACE.

Carlos Troyer; director of museum, J. Z. Davis. The board of trustees consists of W. O. Burnett, Charles F. Crocker, D. E. Hayes, E. J. Molera, George C. Perkins, Adolph Sutro, John Taylor.

THE Rich Bar Placer Gold and Mining Company has been organized in Oakland, with O. F. Sites, F. B. Whiting, S. W. Bugbee, A. M. Benham and R. B. Snell as directors. The capital stock is \$500,000.

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W. B. EWER, } EDITORS
 CHAS. G. VALE, }
 ALFRED HOLMAN.....MANAGER

Our latest forms go to press on Thursday evening.

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San Francisco, January 7, 1893.

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(NEW THIS ISSUE.)

Mechanics' Institute Exhibition.
 Dividend Notice—Pacific Coast Borax Co.
 Partner Wanted—"Shasta," this office.

See Advertising Columns.

Comment.

Governor Markham is decidedly of the opinion that it is the duty of Congress to revive hydraulic mining in California. In his message to the legislature on Tuesday occurs the following paragraph: "In my inaugural address I said all that I deemed necessary upon the mining question in this State, and I say again that I meant every word that I said. I can only reiterate that we must look to Congress for assistance, both for our mines and streams. This request should be made upon the hypothesis that it is the duty of the Government to provide means whereby the important industry of mining can be revived without inflicting substantial injury to other interests. I honestly and firmly believe this can, and some day, will be accomplished."

The miners of this State owe a debt of gratitude to this gentleman, who is the first Governor of California for years who has been plain and outspoken on this subject. It must be remembered, too, that he comes from a section of the State where there are no hydraulic mines. It is but just to say that the recommendations made by the Governor in his inaugural address ultimately led to the action of the legislature which brought about the miners' movement last year and the subsequent legislation in Congress. What he says in his message this year still further strengthens the hands of the miners and will have great influence with the legislature in any measures which may come before it.

It does not seem to be yet fully decided as to the place of construction of the new naval vessels. Dispatches from Washington state that one of the vessels will be built in this city, while late advices are to the effect that Mr. Scott, who is in Washington, thinks both contracts will go to the Cramps. A definite decision will doubtless be reached in a few days. It is to be hoped that the Navy Department can see some way by which it can have one vessel built here. The Union Iron Works people have spent large sums to equip their yard, and they ought to be given business enough to keep it going. They have facilities for everything now except the armor-plates, which have to be shipped from Pennsylvania, and can build a vessel as rapidly as at any eastern yard. In case neither of these contracts come to this coast, many skilled workmen will have to be discharged from our local shipyard. There is small encouragement for them to remain here unless they have steady work, and as the Government may at any time need these vessels, it ought to make suit-

able provision for dividing its work in such a way that both sides of the continent may get a share.

Rather a curious cause for delaying railroad trains was that met at Port Costa this week. The big ferry boat which carries the trains across Carquinez Straits to Benicia was unable to get all the way into the slip on the Port Costa side because it got filled up with floating tules coming from the overflowed lands up the river. The current brought the tules in great quantities into the slip, and when the big boat came in she pushed them in front of her, wedging them under the apron as would a huge hay press. They were then unable to lower the apron so as to take the cars aboard. This happened twice in one day, and at one time caused a delay of four hours with the trains. A gang of men had to go under the wharf and cut the tules out in bunches before a landing could be made.

It is reported that about 7000 men have gone to the San Juan placers in southern Utah, and they are coming in at the rate of 600 a day. They are scattered over a territory 150 miles in extent. Gold is found all over that region. The diggings begin near Bluff City and extend 250 miles along the San Juan and the Colorado river and over the adjacent country. Reports indicate, however, that thus far only a few rich spots have been found, and that much of the ground, while it contains gold, will hardly pay to work. At this season it is a very cold region, and there will doubtless be much suffering among those improperly equipped. A placer excitement, no matter where it is, will attract miners and prospectors as nothing else will. They all remember the early days of California and Montana, and will undergo all sorts of hardship to get on the ground early in hopes of making a stake quickly. The country down there is not a good one for poor men, and many are doomed to disappointment.

Undeveloped Mining Claims.

In a recent issue of the MINING AND SCIENTIFIC PRESS we took occasion to urge upon owners of claims to abandon the idea that at no distant day the long expected purchaser would be found to invest his money in a property upon which only assessment work had been done, showing mere suspect holes. The day has passed when the tenderfoot and inexperienced customer, in his anxiety to own a mine, could be persuaded to buy an undeveloped claim. They have grown wiser by experience. The probabilities are that the owners of such have wasted the time that if devoted to the object of development would have resulted in determining the value of their claims and very likely have opened up a valuable property; if it proved otherwise, the sooner that fact was known the better.

When the owner of a claim shows no disposition to work it, there is a suggestion of lack of faith on his own part, and this is calculated to impress a would-be purchaser with a suspicion of its merits.

To any person traveling through the mining districts the fact is lamentably evident that the old-time miner is degenerating into a nonproducer; has lost his energies and wastes his time sitting around doing nothing, waiting for something to turn up, while he neglects his claim on the hillside, and while he knows that he could make a couple of dollars or more a day by washing the gravel of a nearby creek. But he will not come to "Chinaman's wages," as he contemptuously calls it.

The energetic spirit of the early day seems to have faded out, with the reduction of earnings and rich placers; but the recollection of those days when miners made their one or two ounces a day is still vivid in the memories of "old timers," and they find it hard to come down to current wages, forgetting the decreased cost of living. So, many of them, because they can no longer earn their \$15 to \$20 a day, compromise by earning nothing. It is true much of the placer ground has been pretty well worked over, and the pay is greatly lessened, but each year after the wash from heavy rains more or less gold is washed down from the banks. This is left to Chinamen to work, and many a dollar is earned by these patient laborers in claims where white men might work if so minded.

It is an exceptional country where any man can earn by his own labor his \$2 or \$3 a day in mining when other resources fail, and he has no quartz claim to work with a prospect of seeing it some day develop into a valuable mine. He should bear in mind that all mines now returning remunerative profits to their owners were once mere prospects, and would have so remained had not the owners developed them to a point to prove their value. There are probably as many good mines or what would prove so by labor awaiting development as have yet been found.

It is one of the peculiar characteristics of the miner that he would rather work for some other man at \$2 or \$3 a

day than work for himself with a prospect of much higher earnings. The complaint of dull times in mining is to some extent the result of the relaxations of effort on the part of the miner. He has grown indolent and indifferent, and contents himself with earning a few dollars to win his daily "grub," and wastes his time that he should employ in working his claim in sitting in the shade and telling stories of the money he made in '49 and '50 and waiting for some greenhorn to come along and buy his undeveloped claim, and this man never comes. There is always a good demand for such properties as promise remuneration for the capital invested, and the complaint that mines do not sell is simply the result of the scarcity of good ones.

There is probably as much gold in California yet untouched as has been produced, and it only requires labor and energy to find it. The question is, are we to leave it to future generations to do so or reap the benefits of its production in this? Agriculture seems to have taken the place of energetic mining to a great degree, and affords occupation for large a population, but there is still a large percentage of idle men who are better skilled in mining, who lack the energy to follow it, and reap the more direct reward of their labor. There are undiscovered millions awaiting the pick to produce it. It is labor alone that will release it from the earth and rock and put it afloat.

THE MINING AND SCIENTIFIC PRESS is able to quote a recent instance brought to its attention as an illustration of the result to a miner, who, after reading our former articles on this subject, went vigorously to work on his claim which he had suffered to lie idle for years, with the result of striking a fine ledge of high grade ore inside of a month, that promises to turn out a big mine, and insure him a competency for life. How many similar instances might we not be able to chronicle if others would follow such an example, and go to work on their long-neglected claims and develop them.

There is plenty of gold yet to be found in California by working for it. It is not the belief in the scarcity of good mines that we complain of, but the want of energy and enterprise lacking to bring the hidden thousands to light. There is no other reason why the gold product of California cannot be doubled. What we need is more of the spirit, energy and industry of the early days. We are taking life too easy and losing our ambition, the result in a measure doubtless of the low cost of living. But should we be content to barely eke out an existence and let the golden prize slip from our hands to enrich future generations for which we are showing so much consideration?

The Governor and the Mining Bureau.

The Governor of California, while he is generally favorable to the mining industry, as shown by his official addresses and messages, does not appear to be entirely satisfied with the State Mining Bureau, or the methods under which it is conducted. In his message to the legislature he recommends some radical changes, in the following language:

The Statutes of 1885, Chapter 166, provide in one sentence that the Trustees "shall have the right to appoint a custodian of the museum and other employees." The very next sentence says the State Mineralogist "shall have the right to appoint a custodian of the museum and other employees, subject to the approval of the Board of Trustees." There is another provision that the State Mineralogist shall consult "the board in all matters of importance"; but it does not in any way place the Mineralogist under any obligation to act on their advice. By a careful study of the statutes cited, it will be seen that the Board of Trustees have really no control of the State Mineralogist or his assistants, except to disapprove salaries or expense accounts. There have been for years many disagreements between the Trustees and the State Mineralogist, growing out of the conflict in the laws referred to and the limited powers conferred upon the board. I think that your honorable bodies should remedy this at your present session. I recommend (1) that the State Mineralogist be placed directly under the control and supervision of the board in all things; (2) that they have the power to appoint and discharge all subordinate officers; (3) that they be clothed with the power necessary to conduct the affairs of their institution; and that they be put on the same footing as other boards and commissions in this State in this respect.

This would, in effect, deprive the State Mineralogist of all the patronage of the Bureau and make him subordinate to the trustees in almost every respect. This would be all very well provided the Governor would exercise judgment in the selection of the board, and pick out men with some knowledge of how an institution of this kind could be made practically useful. The gentlemen selected have usually been those who have made some money in mining or have been identified with the industry in some way. Speaking generally, they have exercised little or no influence with the reports, or with the conduct of the Bureau. This may be due, however, to the conditions stated by the Governor.

If they had been able to exercise any control over the State Mineralogist, they might, to advantage, have studied up the methods adopted and carried out in similar institutions in other countries. At least they could have given more attention to the character of the work carried on,

and endeavored to learn the wants of the mining community. All these matters have been left to the individual judgment of the State Mineralogist. In one instance this official bent almost his entire energies toward perfecting the mineral cabinet, and published extensive catalogues referring to such cabinets. Another one occupying the office shaped his reports with apparent reference to ultimate influence to be gained for appropriations in the legislature. To accomplish this, much "padding" was necessary, and all sorts of mining properties, described at length, in the various counties of the State. To such a length has this latter practice been carried, that this time, the Board of Examiners, (of which the Governor is a member) declined to publish the complete report, printing only the brief report of the trustees, and the introduction by the State Mineralogist. This report also called forth from the Governor the following expression, printed in his message to the legislature:

I have carefully read the biennial reports of the various State officers and public institutions, with the exception of those of the State Mineralogist as originally prepared, the State Agricultural Society, the Railroad Commissioners, the Bureau of Labor Statistics, the State Board of Horticulture, and possibly one or two others, which are so voluminous that none but the unemployed and those directly interested and expecting to derive personal benefit from them can have time to read. While it is the duty of those who prepare these reports to inform the public fully in regard to the conduct of their institutions, very often too little time is devoted by their authors to condensing their statements. Intelligent people do not require arguments, but simply facts, from which they draw their own conclusions. The enormous cost of printing some of these volumes seems to have escaped attention in many cases; notably to that of the State Mineralogist, the cost of printing which, as presented, would have been over \$10,000. I have no doubt that this is a valuable contribution, but I believe that \$2000 worth of intelligent editorial work bestowed upon the manuscript would have saved four times that amount in the cost of printing, and the volume would have been of greater value to those interested. People will not read long, tedious reports, and if it were not for the condensed statements given out through the press the people of the State generally would have very little information in regard to our public institutions.

This criticism is severe, but just, judging from previous reports published. A large amount of what has appeared is of interest only to the owner of the particular mine referred to. We took occasion to make this same criticism on the appearance of the last report, regretting that a more practically useful volume could not have been produced for the money expended. Judicious editing by people familiar with the subject would have been beneficial, as the Governor aptly suggests. There is a tendency on the part of the writers of the articles to make as good a showing as possible, and in so doing the matter has become greatly extended. Very little, if any, of the writing is done by the Mineralogist himself; the report being made up by employees of the Bureau, or by outside contributors.

No attempt has ever been made to gather the mineral statistics of the State from year to year, and for these we must depend upon the Government reports published by the U. S. Geological Survey and U. S. Mint. The technology of the industry has also been neglected, very few articles descriptive of metallurgical methods having been proposed.

It is very evident from the Governor's remarks that he is dissatisfied with the Bureau; and it is also evident that when the legislative committee takes up the report which has been referred to it, the whole conduct of this important State institution will be inquired into. The friends of the Bureau and the miners of the State will have no objection to having it put on a firmer and more practical basis than it is at present, though they will decidedly object to its abolition or curtailment of its scope.

Montgomery District.

We had a conversation this week with Mr. W. P. Miller Jr., assistant superintendent of the Breyfogle Co. in Montgomery district, Nev., a camp in Nye county about 165 miles from the railroad. There is only one company working in the camp now and this is known as the Breyfogle, though it will be incorporated under some other name. This company owns about a dozen claims and is now working six of them. On two, quite extensive work is being done. The deepest shaft is about 140 feet. The ledge is a peculiar one and varies greatly in size. The ore is all free gold. A 10-stamp mill has been built here to be shipped to these mines. To reach this district they go by the Atchison, Topeka and Santa Fe Railroad to Fenner, in San Bernardino county, and go over by team, there being no stage line. There are very few prospectors in the camp now, most of them having dropped out. All the men there are working for wages. There is not even drinking water in the camp, this having to be brought on mules. The camp is on one side of the valley and the water on the other. The new mill will be ready to run in the spring, though the millsite has not yet been chosen.

Mr. Miller says that the Keystone mine, in Keystone district, about 60 miles from Montgomery, is getting out some very rich free-gold ore. They have lately been shipping rock valued at from \$500 to \$700 per ton.

Mining Briefs.

THE Lady Washington, Soulsby, Richards and Grizzly mines at Summersville, Tuolumne county, have been consolidated and bonded by a San Francisco corporation.

BELMONT Courier. The southern parts of Nye and Lincoln counties, Nev., continue to attract restless treasure-seekers. New strikes are being made and that country presents more attractions for industrious prospectors to-day than any other part of the State.

THE gold mines north of Winslow on the lower San Juan are being boomed for a good deal more than they are worth. Little is said of the large chunks of ice and snow that can be panned out there at this season of the year.—Mojave Miner.

TALK about handling ore quickly! Mr. Samuel G. McClure, in an article on the types of vessels built on the great lakes, states that as many as 2000 tons of ore have been dumped into a boat in 45 minutes. It takes a strong vessel to stand such a shock as that.

THE mining industry of Fresno county has been rather dull during the past year, owing to the lack of capital seeking investments in mining properties. There have been many failures in this business in Fresno, but it is claimed this has been due more to mismanagement than to the character of the mines themselves.

COL. Mike Gray headed an expedition in 1872 to hunt for the San Juan gold diggings. He left Pueblo with a party well equipped for the journey. They traveled to within 60 miles of the placers when they were obliged to turn back, owing to the scarcity of provisions and the hostility of Indians.

A STORY of the alleged sale of the great tract of niter-bearing soil near Lovelock, Nevada, has been going the rounds of the press. While it is true that negotiations were pending for such a sale to foreign capitalists, they have just been declared off. It was found that the percentage was too low.

THE Anaconda and St. Lawrence mines at Butte are now closed down so far as the extraction of ore therefrom is concerned. With the closing of these properties the suspension of the ore production by the Anaconda Company is complete. The lower smelter at Anaconda is still in operation, and it is supposed will continue so long as the ore now on hand holds out. Just when the company will resume the extraction of ore from its mines is not known.

Personal.

J. B. LOW, the mining expert, has returned from the East.

W. E. SHARON, superintendent of Yellow Jacket, went back to the Comstock from the city on Wednesday.

JAMES R. RYAN, superintendent of the Hale & Norcross and Andes mines, spent the holidays in this city, but has returned to the Comstock.

MR. CLARK, of the Gladstone mine, Shasta county, has gone up there to see what the new body of ore looks like. It is at such a depth as to be very encouraging.

CAPTAIN H. G. MORSE, of the Oceanic Steamship Co's steamer Alameda, delivered a lecture on Tuesday before the Geographical Society of the Pacific on "Revolving Storms."

It is reported that Alvinza Hayward, the well-known mining millionaire, has taken an interest in the old Hardenburgh mine, and consequently a thorough prospecting will be done.

COLONEL D. H. JACKSON has resigned his position as superintendent of the Holmes mine at Candelaria. He will soon leave for Mexico, where he will take charge of some mining property.

F. L. MORGAN, superintendent of the Needles Reduction Co., is in this city purchasing some machinery to add to the capacity of the mill. He will also purchase a hoist to put in a mine belonging to the company.

W. G. HODSON, secretary of the Shasta County Miners' Association, came down from Redding on Wednesday. He has recently been over into Trinity county, collecting some ores and minerals for the World's Fair Exhibit.

IRA SMITH, the new superintendent of the California Navigation and Improvement Company, who was lately appointed to succeed the late Captain Martin Corcoran, has entered upon the discharge of the duties of his office.

PROFESSOR E. E. BARNARD, Astronomer of the Lick Observatory, has received word from the Perpetual Secretary of the Academie des Sciences of Paris that, at the regular meeting held on the 19th of December, he had been awarded the famous Lalande prize of the Academy. The Lalande prize is awarded annually to the astronomer who shall publish the most useful memoir or make the most important observation. It was undoubtedly given to Professor Barnard in recognition of his discovery of Jupiter's fifth satellite, as announced to the scientific world from the Lick Observatory during last September. This award is considered the greatest honor which can be conferred on the astronomical investigator, and is valued far more for the distinction than for the purse accompanying it. Before Barnard, but few American astronomers have succeeded in gaining the Lalande prize, among them Watson, Swift, Newcomb and Hall.

PLANS and specifications for a new system of water works for Santa Rosa have arrived. The new system is that of Wagner's steam well or underground reservoir system. A few months ago the city employed C. Monjeau, secretary of the Cincinnati Water Supply Company, to act as an expert. He came and reported the steam well system feasible. An election to bond the city to build the system will be called in the near future.

Industrial Notes.

THE oldest paper mill in the State is at Taylorville, Marin county. It was established in 1853, and is still in successful operation.

THE State Labor Commissioner recommends the establishment by the State of free employment offices in all cities of over 25,000 inhabitants.

THE steamship companies of this city employ 2036 men, receiving from \$150 to \$250 per month as captains, down to \$25 per month as stewards' assistants.

THE Telegraph avenue electric line, between Berkeley and Oakland, commenced operations on Wednesday. This is said to be the best equipped electric road in the State.

THE steamer Noyo left Fort Bragg Wednesday afternoon with another cigar-shaped raft of logs containing 1,500,000 feet of lumber. This is the fourth big raft huilt to be brought to San Francisco.

THE Tuhhs Cordage Co has discharged all its Chinese employees. They have gradually been putting white men and boys at work for some time past, and the entire rope works will be run in future without any Chinese.

A VERY large dynamo was put in at the power house of the Oakland, San Leandro and Haywards electric road this week. It is of 450 horsepower, and will be run in connection with the 500 horsepower engine to furnish electrical power for the entire system, including the Washington-street extension.

VINEGAR and pickle factories are increasing in this city. In 1891 there were six of them, with an output of 970,000 gallons of vinegar and 120,000 gallons of pickles, worth in all \$200,000. Now there are fourteen factories, turning out over 1,000,000 gallons of vinegar, 150,000 gallons of pickles, and the joint product is valued at \$250,000.

THE carmakers of this city are doing a fine business these days, and this is readily understood when the extension of the streetcar lines is remembered. The electric and cableroads of this city have all their cars made in this city, and in spite of the fact that one of the largest car-factories in the city was burned to the ground there has been a good increase in the output.

DURING the month of December, 1892, local corporations paid a total of \$432,750 in dividends, against \$582,250 for the same month in 1891. The banks paid \$73,500, insurance companies \$3500, gas companies \$66,000, water companies \$70,000, powder companies \$31,500, street railroad companies \$13,000, mining companies \$135,250 miscellaneous companies \$40,000.

THE outlook for the petroleum industry in California is highly encouraging. Such flattering oil prospects have been obtained in Kern, Humboldt and several other counties during the year as denote for this industry early enlargement. Our oil-producing territory covers an immense area, and although the deposits generally lie deep and are somewhat scattered they offer great inducements for the inauguration of new enterprises and the investment of capital.

THE steamer Tihuron, plying between San Francisco and Tihuron, Marin county, was burned at her dock in this city on Monday, just after the passengers had gone ashore. The entire upper works were destroyed, but the hull was saved. What is left of the vessel was towed around to Little Main street Thursday and the work of tearing away the remains of her upper works begun. The work of reconstruction will be pushed forward with all possible speed, but it will be at least three months before the vessel will be ready to take her place on the route across the bay. In the mean time the old steamer James Donohue will take the Tihuron's place.

THE Hibernia bank lent \$3,870,936 on city property in 1891 and \$4,384,815 in 1892. The German bank lent on city property \$2,322,265 in 1891 and \$2,520,091 in 1892. The Savings union lent \$1,704,787 in 1891 and \$2,087,235 in the city in 1892. The Humboldt bank lent \$734,556 on city real estate in 1891 and \$497,970 in 1892. The French bank lent \$549,500 in 1891 and \$441,260 in 1892. The Clay-street bank lent \$542,050 in 1891 and \$409,579 in 1892. The Security bank lent \$253,700 on city real estate in 1891 and \$366,975 in 1892. The most of the money of five of our savings banks is lent out on interior lands, while two of them also lend in Oregon and Washington.

FOLLOWING close upon the opening of the Lifeboat by the Salvation Army people another interesting department has been added to the organization in the shape of a bureau of employment at the corner of Sacramento and Kearney streets. At that place applications are received from the help-wanting public for every character of employe from longshoreman to expert accountant. Captain McFee who superintends the establishment, desires all who wish help to apply to the bureau where they will receive immediate attention free of charge. An industrial department will be opened on Grant avenue next week where mattresses, brooms and other articles will be manufactured.

THE Callistro Company was organized by women to work a deposit of material used as a silver polish. They built a factory and began sending callistro all over the coast. They finally bonded the property to some Chicago people and agreed to close down. A year ago the women left the directory and some men took their places, but the works have since remained idle. At the annual meeting this week the women voted their shares in such a way as to again resume control of the company. The new directors are as follows: Mrs. Clara F. Hamilton of Oakland, Mrs. E. P. Eells of this city, Mrs. E. P. Buckingham of Vacaville, Mrs. Samuel D. Mayer, Mrs. Henry Wetherbee, Mrs. N. C. Whitney and Mrs. Sarah H. Tompkins. Mrs. Hamilton was chosen president, Mrs. Eells, vice-president; Mrs. Mayer, secretary, and Mrs. Wetherbee, treasurer. It appeared from the treasurer's statement that the company is in debt \$27,000, amply secured by lands outside the callistro holdings. The works will be started up again at once and callistro be put upon the market.

Exaggerated Mining Reports.

SAN FRANCISCO, Jan. 2, 1893.

TO THE EDITOR: I have had a good deal to do with mines and mining business in my day and am, as I may say, somewhat familiar with matters thereto pertaining.

I have noticed during my long experience some peculiar characteristics of the miner that, I fear, have led to the use of the term "honest" as intended in an ironical sense, growing out of, probably, his vividness of imagination. It is human nature to him to be sanguine, and it is this sanguine temperament that leads him to deceive himself often in his firm belief that he has before him in his claim the coveted thousands, as the reward of his labors; and he is indignant that the would-be purchaser in his cool, calculating way does not accord with his honest belief in its merits.

It is a well known fact that he will, with a view to ascertain for his own satisfaction the value of his ore, instead of taking average samples, be certain to select the richest piece in the dump, and build his hopes on the result of the assay, thereby deceiving himself as to the true value of his ore; but the highest flights of imagination and romance is reserved for the amateur writers of reports on such mines.

The owner of the claim desiring to have a report on his property and not feeling able to pay the high fee of the professional scientifically educated engineer, calls in the amateur, the usually termed "practical man," who professes to ridicule what he terms the highfalutin engineer, and hases his own claims to be a judge of mines on the fact of his having worked in them himself, hence is practical in experience. With, of course, no knowledge of the laws of formations or the geological characteristics of the rock he is called upon to examine, his report is often a confused jumble of scientific terms most amusing to the initiated; but it reads well to the general public, which knows nothing of the subject.

The amateur, with a view to making a report pleasing to his employer and reconciling him to the fee for the examination, allows his imagination to indulge in the wildest flights, and the report vies with the most extravagant romances of the age. In his desire to give the mine a good "send off," he deceives the owner and makes the mine appear to be a veritable bonanza—not what it really is, but what the owner wishes it to be.

With this report in his pocket the owner betakes himself to the nearest city to sell or enlist capital and, on the strength of the report, contracts to pay the expert the would-be capitalists may select to make an examination of the property, for their security and satisfaction.

It is needless to say that in nearly every instance the report is adverse, and the sanguine owner is the poorer for the transaction; but in his persistent belief in the merits of his mine and the judgment of the "practical man," his faith remains unshaken, and he "cusses" the ignorance and prejudice of the capitalists' expert, as "one of those d—d scientific, 'edicated,' Freiburg fellers, who don't know a mine from a hole in the ground," and hints that "the feller" has a mine of his own to sell his employers.

A collection of mining romances in the shape of reports on mines, if published, would afford entertainment for readers of fiction unequalled by any modern publication. They would marvel at the power of imagination of the authors, while those who have a tendency to believe everything true that is printed would wonder why all this scare about the depletion of gold consequent upon shipments abroad, when the woods and rocks were full of it, only awaiting the taking. The attention of publishers is called to this hitherto neglected and unrivaled theme for gratifying the sufficed readers of tales of the wide and woolly West, who require a more stimulating literary tonic.

MINING SHARP.

Statistics of the Mineral Industry.

"The Mineral Industry: Its Statistics, Technology and Trade," is the title of the annual statistical supplement to the New York *Engineering and Mining Journal*, shortly to be issued. The work of collecting and publishing in the *Journal*, within a few days of the close of each year, reliable statistics of the mineral industry of the United States and other countries, whose products are valued at far more than \$2,000,000,000, has become so important that a large octavo volume will be issued in January, 1893, covering them.

It will treat each of the various subjects in the following general order: Describing the occurrence and character of deposits in which the minerals are found; the characteristics of the mineral; methods of treatment; cost of mining; characteristics of metal or other products; costs; uses; statistics of production; imports and exports from the earliest times; consumption, total and per capita; review of markets; prices; foreign production; imports, exports and consumption; technical articles by competent authorities giving the recent progress in each department of mining and metallurgy. The progress in the chemical industry will be given in expert reports covering the industry to the close of the present year in Europe and America. The subjects treated will include: Acids, aluminum, antimony, asbestos, asphaltum, bauxite, borax, brimstone, bromine, barytes, chemicals and chemical fertilizers, chromium, coal, cobalt, copper, corundum, flourspar, gold and silver, graphite, gypsum, iron and steel, iron ores, lead, manganese, mica, mineral paints, natural gas, nickel, petroleum, phosphates, platinum and platinum minerals, precious stones, pyrites, quicksilver, soda (natural), sulphur, sulphuric acid, tin, zinc, etc. The price of this volume is set at \$2.00, bound in paper, and \$2.50 in cloth.

In 1887 there were only 13 electric roads working throughout the entire country. There are now in the United States and Canada over 500, representing a capital of over \$200,000,000.

Mica.

How It Is Mined and Prepared for the Market.

The name mica is not that of a single mineral, but is a family cognomen which includes a number of varieties. With the outward attributes of the family we are all familiar, for under the common name of isinglass it forms a small part of the stock in trade of every householder. The family is one of some importance in mineralogical classification. All are shining members, and are alike in splitting into extremely thin leaves or plates; in being more or less transparent; in being highly elastic; and in having certain ingredients in common. There are seven well-defined minerals which lay claim to the family name, besides an extensive list of relatives which have been formed by alteration or exposure to air and water. The series runs from the compact, glistening mica found in granite and gneiss, through many gradations of hydrous micas, until we reach the ordinary soap-stones and clays. But the name properly stops when the mineral loses its glistening surfaces, for the Latin word *micare* (to shine) no longer applies. Our German friends call it glimmer, a name whose significance is readily seen.

The location of the quarries has been largely accidental. So far as I have been able to learn, the first one opened was the Sinkhole in Mitchell county, N. C. The spot was marked by the existence of trenches, many hundred feet long in the aggregate, and in places fully 20 feet deep. Large trees growing on the debris indicated that the workings were very ancient.

Then, as now, the mountaineers were largely guided in their search by the ancient workings. These were probably made by the aborigines and were also for the purpose of obtaining mica. The imprint of their stone implements may still be seen in the decomposed stuff at the sides of the opening. What these people used the mica for is still problematical. Large plates of it have been found in the mounds of Eastern Tennessee, and would indicate that it had domestic application, or was used for personal decoration. The mica is seldom prepared for market at the quarry, but is taken to a conveniently located glasshouse. This generally means a transportation of several miles. Frequently the quarries are on steep mountain sides, and are only connected with the outside world by the roughest sort of trails. In this case, the mica is "packed" down the mountain on the backs of men to the wagon road in the valley below. At the glasshouse, the mica is put into shape for shipment. The blocks vary greatly in size. One from the Wiseman quarry, near Spruce Pine, is reported to have been six feet long by three wide. Pieces a yard in diameter have been obtained at the Ray quarry, in Yancey county, and similarly large plates have been found in Siberia, but these are exceptional. The average size of a block is a little larger than the page of a magazine, and is generally less than six inches in thickness. It separates very readily into sheets parallel to the base of the prism. It is estimated that this cleavage may be carried so far that it would take three hundred thousand of the mica plates to make an inch. It is needless to say, however, that such a thickness is not suitable for use in stoves and furnaces. The mica is generally split into plates varying from about one-eighth to one-sixty-fourth of an inch in thickness. In preparing these plates for market, the first step is to cut them into suitable sizes. Women are employed in this work, and do it better than men. The cutter sits on a special bench which is provided with a huge pair of shears, one leg of which is firmly fixed to the bench itself, while the movable leg is within convenient grasp. It is requisite that the shears be sharp and true, for otherwise they will tear the mica. The patterns according to which the mica is cut are arranged in a case near at hand. Generally they are simple rectangles, varying in size from about four square inches to eighty.

The cutter selects the pattern which will cut to the best advantage, lays it on the sheet of mica, and then, holding the two firmly together, trims off the edges of the mica to make it correspond with the pattern. When the cutter completes her task, she has all the mica piled away in little bundles under their corresponding patterns, while the scrap falls in a glistening heap on the floor. The cleaning process comes next. The cleaner must examine each sheet of cut mica by holding it up between her eyes and the light. If there be any imperfections, they must be removed by stripping off the offending layers of mica until a clear sheet remains. The cleaning is done by means of a sharp pen-knife—and considerable discretion. It is quite easy to tear away the entire sheet and have nothing left for one's trouble. Both the cutting and cleaning are tiresome routine operations, yet there is a certain fascination about tearing the mica to pieces that few have philosophy enough to resist. Finally, the cut and cleaned mica is put in pound packages, and is ready for market. There is an enormous waste in the process of preparation. One hundred pounds of block mica will scarcely yield more than fifteen pounds of cut mica, and sometimes it is even less. The proportion varies, of course, with different localities.

The chief use of cut mica is in stoves, and its comparative cheapness has made possible the luminous—not to say artistic—wonders which constitute the latest and most cheerful creations of the stove men. The sheets are also used in the peep-holes of smelting furnaces, in lanterns, in shades, and in the port-holes on board naval vessels, where the vibrations would soon demolish less elastic glass. Mica is an excellent nonconductor, and of recent years has been cut to some extent into narrow strips for use in the construction of dynamos.

The scrap mica was formerly thrown away, with the exception of a small quantity used as a lubricating material, but it has recently found a market in several new directions. Old waste heaps are being bought up, for a few dollars a ton, and their contents cleaned by being passed through a big mill. This is simply a rotating cylinder of coarse wire screen with its axis slightly inclined to the horizontal. The scrap is fed into the upper end of the cylinder, and slowly

discharges itself from the lower end. As it makes its way from end to end, the sand and trash fall through the meshes of the screen.

The cleaned scrap is then ground into a coarse powder and distributed to the various industries requiring it. Large quantities are used in the manufacture of wall paper. The mica produces a sparkling surface which is thought to be decorative, but at best the effect is somewhat bizarre. Considerable amounts are used to produce the snow effects on Christmas cards, and in stage scenery and other tinsel; while smaller packages, under the name of diamond dust, are sold as powder for the hair. Much of the ground mica is sent to France, and this, oddly enough, when the East Indian sheet mica is pressing our own pretty heavily in the home market. The Latin world used the mica dust to strew over the Circus Maximus, while mediæval Europe knew the golden and silver scales as cat-gold and cat-silver.—C. Hanford Henderson in *Popular Science Monthly*.

Artesian Wells.

One of the most remarkable features of California and one that strikes the visitor with wonder is the artesian wells that are seen in various parts of the State. And it certainly is good ground for wonder when one sees a pipe sunk into the bowels of the earth, from which pours without ceasing or diminution a flood of a million and a half or two million and a half gallons daily. Artesian wells have been successfully sunk in many parts of the State.

They are found in the Santa Clara valley, in the San Joaquin and in the counties of the far south. But it is unquestionable that the most remarkable development in this direction has been in what is known as the artesian belt of Kern and Tulare counties. When it is known that single wells, sunk at a cost of from \$1,000 to \$2,000, afford a flow of water sufficient to irrigate an entire section of land, a faint idea can be formed of the vast importance and the illimitable possibilities presented.

There are artesian wells in some localities which flow as high as two and a half million gallons daily. This is sufficient to irrigate 640 acres of land. When it is known that without this water the land is practically valueless, and worth at the most \$2 or \$3 an acre, while with it the same land is fully equal to that for which \$100 or \$200 an acre is asked elsewhere, then an idea may be formed of the vast importance and value of the artesian system.

There are many advantages in a farmer owning his own source of water supply instead of having to depend upon ditches or canals owned by others or by incorporated companies. These advantages need not be discussed here, but every irrigator is fully cognizant of them. Consequently the intending settler should be guided by the experience of others, and if he can buy land at a moderate rate within the limits of the artesian belt he cannot do better than locate there, and either singly or in a conjunction with some one or two neighbors, sink a well.

It has been abundantly proved that within certain quite well defined limits, there is no such thing as failure to strike a good flow, while by a few settlers combining, the cost to each may be made very small, and at the same time the result will be in the highest degree satisfactory.—Irrigation Age.

The Game Law.

When the game law was amended the law used was so ambiguous that a great many construed it to mean that game used for food could be killed at any season of the year. Of course it was never intended that such a license should be granted.

Crittenden Robinson, president of the Sportsmen's Association, addressed an inquiry to the Attorney-General and received in reply the following:

"Yours of the 26th ult. received. I agree with you in the construction of game laws: Section 626 Penal Code, Statutes of 1891, page 472. The killing of game is not *malum in se* or wrong of itself, but is wrong only when, for the public good, it is prohibited by statute. The best of citizens, through lack of acquaintance with law, are liable to violate it.

"Under the eighth paragraph of the statute, it is a misdemeanor to kill any of the birds or other animals therein mentioned at any time of the year, whether during the open or closed season, 'unless the carcass of such animal or bird is used or preserved by the person taking or slaying it, or is sold for food.'

"This was enacted to prevent the wanton and wasteful destruction of game by persons who are not in pursuit of food either for themselves or for others, but who kill for mere amusement or for the hides of animals. The law is a good one and should be rigidly enforced, for game is becoming scarce in the State, and the food supply of a country cannot be too great. I do not think any one in this office ever meant to express views differing from these."

THE Pacific Reduction Works of Nevada city, have lately been purchased from the Citizen's Bank of that city, by Messrs. Hall, Black, J. and J. G. Northey. For a long time the works had been held on a mortgage from A. Maltman. Under the present management the works have been running successfully for the past three months. Much of the sulphurets formerly shipped to Salt Lake, Portland, and San Francisco are now treated here. The large furnace is run to its full capacity, handling from four to five tons of concentrates per 24 hours. Returns for both gold and silver are made and prove satisfactory to the mining companies and the management of the chlorination works. The value of the work done aggregates \$10,000 a month. At present the chemical shops and settling reservoirs are some distance from the furnaces. These, however, will shortly be moved and put in close connection with the roasting plant and thus greatly facilitate the handling of the concentrates.

J. H. MORTON is superintendent of the Mammoth mine, Old Diggings, Shasta county.

Cube and Square Roots.

For the Boys.

TO THE EDITOR:—In the *Scientific American* supplement of September 6, 1890, Prof. H. A. Wood, of Stevens' School, gives a new method of extracting the cube root of a number, as follows:

OPERATION.

$$\begin{array}{r} 11^3 = 121 \ 1,412,467,848 \\ \underline{1167} \\ 3 \ 3367 \\ \underline{1122, \text{ cube root.}} \end{array}$$

In this example the cube root of the first two periods is readily found to be 11, which we take as the trial root. Dividing its square into the given power to four terms, since the root contains four figures, we obtain the quotient 1167. To this quotient adding twice the trial root, regarded as hundreds, and dividing by 3, gives 1122, the correct root.

NOTE. 1.—If there is a remainder, after dividing by 3, it is disregarded.

2. The first term of the root is determined by inspection. The second term of the trial root, if not readily apparent, may be found by trial, or as the entire root is found above, when two figures are used as the trial root. The first two terms of the quotient must not differ by more than a unit or two from the trial root.

SOLUTION OF SECOND EXAMPLE.

$$\begin{array}{r} 15^3 = 225 \ 3,341,362,375 \\ \underline{1485} \\ 30 \\ \underline{3 \ 4485} \\ 1495, \text{ cube root.} \end{array}$$

In this example, taking 14 for the trial root, the first two terms of the root being then 17, shows that 14 is too small. Taking 16 as the trial root, the quotient then being 13, shows that 16 is too great. By this means the second term of the trial root may be found, or the first two terms may be extracted by the usual method of extracting cube root.

3. Required the cube root of 2515, correct to 7 decimals.

$$\begin{array}{r} 14^3 = 196 \ 2515.0 \\ \underline{12.8} \\ 28 \\ \underline{3 \ 40.8} \\ 13 \ 6, \text{ 1st ap. root.} \\ 13 \ 6^3 = 184.96 \ 2515.00000 \\ \underline{13 \ 5975346} \\ 27.2 \\ \underline{3 \ 40.7975346} \\ 13.5991782, \text{ cube root correct to 9 figures.} \end{array}$$

4. Required the cube root of 20. The nearest cube to 20 is 3³.

$$\begin{array}{r} 3^3 = 9 \ 20.0 \\ \underline{2.2} \\ 6. \\ \underline{3 \ 8.2} \\ 2 \ 7, \text{ 1st T. R.} \\ 2 \ 7^3 = 7.29 \ 20.000 \\ \underline{2 \ 743} \\ 54 \\ \underline{3 \ 8.143} \\ 2.714, \text{ 1st ap. cube root.} \\ 2.714^3 = 7.365796 \ 20.000000 \\ \underline{2 \ 7152534} \\ 5 \ 428 \\ \underline{3 \ 8.1432534} \\ 2.7144178, \text{ 2d. ap. cube root.} \end{array}$$

From these examples we deduce the following

RULE.

I. Having separated the number into periods of three figures each, counting from the right, divide by the square of the nearest root of the first period, or of the first two periods; the nearest root is the trial root.

II. To the quotient obtained add twice the trial root and divide by 3. This gives the root or first approximation.

III. By using the first approximate root as a new trial root and proceeding as before, a nearer approximation is obtained, which process may be repeated until the root has been extracted or the approximation carried as far as desired.

REMARK.—In example 4 it will be observed that the second term, or first two figures of the root, were obtained by using for trial root the root of the first period. Using, in like manner, these two terms for trial root, we obtained

four terms of the root, and these four terms of the trial root gave seven figures of the root correct. In that example the last figure should be 7. Should we take these eight figures for trial root, we should obtain at least 15 figures of the root correct. In general, by carrying the division to twice the number of places used in the division, the last figure will be correct, or but a unit or two out of the way.

Prof. Wood gives an algebraical demonstration of the principle used in his elegant method, for which I refer the curious to the original article.

I find that an analogous procedure may be applied to square root. Let us try it:

$$\begin{array}{r} 95 \ 93 \ 12,25 \\ \underline{980} \\ 95 \\ \underline{2 \ 1930} \\ 965, \text{ square root.} \end{array}$$

Again:

$$\begin{array}{r} 4.5 \ 20.0 \\ \underline{4 \ 44} \\ 4.5 \\ \underline{2 \ 8 \ 94} \\ 4 \ 47, \text{ first approximation.} \\ 4 \ 47 \ 20 \ 00 \\ \underline{4 \ 474} \\ 4 \ 47 \\ \underline{2 \ 8 \ 944} \\ 4 \ 472, \text{ second approximation.} \end{array}$$

I find these methods easier to remember than those of the schoolbooks; their chief utility, including the subject of my previous article on squares and roots, lies perhaps in their application to the extension of the engineers' tables of squares, cubes and roots to numbers not therein given.

C. H. AARON.

Cheap Engineers and Expensive Lawyers.

We frequently receive very decided expressions of opinion from those whose experience makes them the best judges against the old-fashioned, short-sighted, penny-wise and pound-foolish policy of employing the cheapest possible service in engaging professional engineers, while, when it comes to lawyers' fees and presidents' and managers' salaries, large sums are paid without hesitation. Any one who will take the trouble to find out how much time must be spent and what the amount and nature of the studies are to become a good engineer, and then compare this with that required to become a good lawyer, cannot fail to notice how much greater the former is. Moreover in the engineering profession one must continue to study and keep abreast with the rapid progress made in engineering, while in the lawyers' profession the term "progress" hardly exists. Of the four professions, medical, theological law and engineering, the latter is certainly the one in which one's reputation depends entirely on ability, that is, the one which requires the most conscientious work in order to gain and keep a good reputation. When an engineer is ignorant, and makes mistakes in building a bridge, machine or a mining plant, for instance, which thereby breaks down, there is no question where the fault lies and whose it was, and, what is worse, the lives of innocent victims are often at stake. Of all professional men, therefore, the engineer must work, study and practice in the most thorough and conscientious manner. We should, therefore, be selected with the greatest possible care, and receive the most liberal remuneration. The man who will take the greatest care in engaging a physician, regardless of cost, will go to his factory and engage cheap and incompetent professional engineers, and practically intrust the success of his manufactured products or constructions to their care, and then wonder why other manufacturers who pay for able talent are more successful. Some companies pride themselves, and with right, on the professional engineering talent which they employ and can retain by paying properly for it, but there still appears to be many who stick to the short-sighted policy of under-paying the one in whom the success of their products, to a great extent, lies.—The Electrical World.

THE late Wm. A. Aldrich of Oakland was a man who was interested in many industrial enterprises in that city and in San Francisco. He left an estate of about \$600,000 in value, which has just been appraised by Thomas Prather, Albert Miller and W. E. Miller, three gentlemen well qualified for their task. The value of the shares in many of the companies, as stated by the appraisers, is of general interest. Among other stock held by the late Mr. Aldrich were 5421 shares of stock in the South Feather Water and Union Mining Company, appraised at \$100 per share; 435 shares stock Oakland Bank of Savings, valued at \$75 per share; 810 shares stock Merced Security Savings Bank, at \$45 per share; 1100 shares of stock Savings and Loan Society of San Francisco, \$100 per share; 300 shares stock Bank of California, valued at \$262.50 per share; 1250 shares stock Pacific Power Company of San Francisco, valued at \$37 per share; 200 shares San Francisco Gas Light Company, at \$70 a share; 534 shares in Great Western Quicksilver Mining Company, valued at \$5 per share; 50 shares in California Powder Works, at \$150 per share; 550 shares in San Francisco Tool Company, \$40 per share; 171 shares Germania Lead Works, San Francisco, \$50 per share; 10 shares Pacific Surety Company, at \$102.50 per share; 100 shares Presidio and Ferries Railroad Company, San Francisco, at \$25 per share; 226

shares in Paraffine Paint Company, San Francisco, at \$0.75 per share; 1000 shares in Alaska Coal Company, at \$1.50 per share; seven first mortgage bonds of the Consolidated Piedmont Cable Company of Oakland, full value \$1000 each, appraised at \$900 each.

Gold Mining in the Southern States.

Up to the time of the discovery of gold in California, this precious metal was mined in the South Atlantic States of Virginia, the two Carolinas, Georgia, Alabama. The annual product was not large enough to give the United States a prominent place in the ranks of the gold countries, but nevertheless it had a place. The United States mint was established in Philadelphia in 1792, but the Carolina and Georgia mines were considered of sufficient importance to justify additional coinage facilities near to the sources of supply, and consequently a branch mint was set up at Charlotte, N. C., in 1837, and another at Dahlonega, Ga., in 1838. The New Orleans mint was also established in 1838, with the object of coining the silver received in trade from Mexico.

According to the mint records, as given in the official report of the superintendent, the total product of gold mined in the limits of the United States from the establishing of the mint to the discovery of gold in California, a period of 56 years, from 1792 to 1848, was \$24,536,000, less than half a million a year. After the enormous richness of the California deposits became known, there was a wild rush for the Pacific slope, and mines along the Atlantic ranges of foothills were much neglected, though not entirely abandoned. These Atlantic slope sources of gold supply are in the hills along the eastern base of the Blue Ridge or Appalachian chain of mountains. In Alabama, where the range loses its continuous and ridge-like forms, and breaks into rugged knobs and rocky hills, the gold deposits extend around their southwestern slopes. The gold originally occurred in veins and seams of quartz, associated with granite, slates, mica and talcose rocks, the ordinary accompaniments of gold-bearing quartz. Where the material carrying gold has been decayed by the weather, or broken down by physical forces, the gold is found in the gravel in the beds of streams, as in the case of the California placers.

These mines of the Appalachian range are still worked, and the introduction of improved processes has considerably increased the production. A recent mint report shows a result which, while it is far from realizing any dreams of fabulous wealth, shows that there is gold enough to be worth working for in these southern States. It is as follows for the year 1889:

States.	Gold Produced.
Virginia.....	\$ 4,100 00
North Carolina.....	146,295 00
South Carolina.....	46,852 00
Georgia.....	107,605 00
Alabama.....	2,589 00

Total.....\$317,433 00

This is not up to the average yearly production of these States in the ante-California period, but it all proves that the southern States, in addition to their other rich resources, are also producers of the most precious of the metals in commercial and financial use.—New Orleans Picayune.

The Mica Mines of Nellore.

Dr. Warth, officiating superintendent of the Central Museum, London, has written a most interesting report upon Mr. E. H. Sargent's mica mine near Inikurti, a place 19 miles from Nellore. Mica is the talc of commerce, although scientifically speaking the latter is quite a distinct mineral. Some idea of its value may be gathered from the following approximate rule for calculating the price of ready-cut selected rectangular pieces in London. One pound weight costs as many times twopence as each single piece has square inches surface. This equation holds good between 10 and 100 square inches. Below these limits the prices are smaller and become finally nil; above these limits they are higher and would end in fancy prices. Although Mr. Sargent's mine has only reached a depth of 60 feet, no less than 20 tons of pure ready-cut mica have been extracted during the past two years. It appears that the first indication for this deposit was a ridge of quartz which stood 8 feet above the surface of the plain. Then Mr. Sargent found old excavations on the west side of the ridge, which he followed up. At a distance of about ten miles to the south Dr. Warth found quite a group of more or less successful mica mines in similar rocks near the village of Utkur. The mica was associated with the same white quartz and whitish feldspar. There were also the same accessory minerals, garnet and tourmaline. One mine, called Sukbagini (black stained mine) produces mica which is stained black and brown through the spread of manganese ore and iron between the planes of cleavage. Some slabs of very clean surface, without any cracks whatever, 27 inches by 32 inches, were in store. The price of these would have been fabulous if they had not been black. We further learn from Dr. Warth's report that the sorting of the mica is very important for the trade. A large quantity of the mica is thrown away at the pit, where the waste heaps glisten in the sun. Of the mica brought to Mr. Sargent's stores at Inikurti, only about 23 per cent is finally selected for the trade. Everything else is thrown away, being either cracked, not sufficiently transparent, ripple-marked, or too small. The smallest limit of rectangular size is 2 inches by 2 inches, but such small sizes are at present very cheap, as Bengal exports too much of it. The pieces are all cut according to rectangular patterns. Pieces of the same pattern are then tied in bundles and so sent to London.

Mechanical Progress.

The Future of Machinery.

Advanced ideas in any sphere of human endeavor are seldom received with favor, and the artisan or thinker, or whatever he may be, who presumes to enlighten humanity upon truths which it is unprepared to receive, is very apt to be treated with ostracism or contumely for his pains. But as all progress is made through sacrifice of some kind or other, we may rest assured that the truth, be it social, economical or otherwise, will force its way despite all obstacles to a triumphant victory.

The truth of the foregoing, adds the *Age of Steel*, finds a splendid exemplification in the history of mechanical progression. The toiling thousands found it difficult to believe that the new innovations of machinery in their various occupations would not leave them eventually without anything to do, and in some cases there were those who strove to throw legislative stumbling-blocks and other obstacles in the way of the unwelcome competitor of manual labor. With the lapse of years, however, the mists of ignorance and prejudice have cleared away, and with the increase of wisdom garnered from observation and practical experience, the grimy-faced toilers in forge and mine and factory have learned to look upon machinery as the friendly ally rather than as the enemy of labor. They have begun to see that the forces of production, however multiplied or improved, can never do any harm to mankind unless, by the mal-administration of economic laws, they be turned from the service of the many to the exclusive benefit of the few.

With this truth fully grasped and comprehended, the tendency of economists at the present time is to shape the forces of production and distribution that this humane view of machinery in its relation to humanity may find a full and complete realization. No man will ever starve because there is too much to eat; and if all do not get what belongs to them, it will not be because there is not enough, but for the reason that the product of their labor has been unfairly administered in the process of distribution; so that whatever men suffer to-day in an economic way, they have ceased to place the blame upon machinery, and have transferred it to the men who manipulate it to the advantage of themselves at the expense of their fellows. Instead of retarding mechanical progress, we are predicting for it an immeasurably wider field of activity, and are speculating upon its application to uses which a short time ago we would have declared a man insane for daring to attempt. We are beginning to look upon machinery, in short, as a means by which man can realize his highest dignity, in mustering it into our service in those fields of industry where the labor we are called upon to do is brutalizing or otherwise injurious to the physical or moral constitution of man. Hence it is that in silent rooms and in lonely garrets, busy minds are to-day painfully struggling to contrive mechanical appliances that will do away with all manual labor that overtaxes or devitalizes human energy in its performance. The mechanical ideal has been shifted to a loftier plane, so that it is now intended that eventually all unintellectual labor, all monotonous, dull labor, all labor that deals with dreadful things and involves unpleasant conditions, must be done by machinery. Machinery must work for us in coal mines, do all sanitary services, be the stoker of steamers, clean the streets and do all work that is tedious, filthy or extremely distressing. There is no doubt but that this is the future of machinery, and its realization, however far removed, will mark an epoch the most brilliant by far in the history of civilization. Mechanical News.

Splicing Woven Belts.

Everyone, says the *Textile Recorder*, who has had any experience in the splicing of that class of woven belts which are now in such extensive use, is fully aware of the great difficulty which exists when it is necessary to piece them. The most common practice is to join the two ends by malleable iron fasteners, which are fitted with screwed shanks on which nuts can be placed. In what is, perhaps, the most successful of these arrangements, the ends are turned up and bolted together in this way. But it is obvious that, whatever may be the merits of such an arrangement, it is calculated to throw the belt out of balance while it is running, owing to the addition of weight at one point. This has not been objected to hitherto because of the general effectiveness of the fastening, but it is quite clear that a method which, while equally effective, is free from

the fault named, will be of considerable value. Such a method has been introduced by Messrs. Fenton, of New Lanark, who proceed by splitting the ends of the belts by suitable means. In lieu of this the belt may be woven in layers at the point where it is desired to join it, but this, of course, implies a foreknowledge of the length of belt to be required. Having obtained the necessary division, however, by any means, two of the four plies or tongues formed are cut away, and the two ends are then fitted into each other. The finished joint is of practically the same thickness and weight as the rest of the belt. By means of suitable cement or glue a perfect union is obtained, but it may be made more secure by the employment of laces, wire threads, or rivets. It is claimed that the belt so pieced is not only as strong as the joining as any belt pieced in the ordinary method, but that, being of an even thickness throughout, it is in a truer balance, which in high-speed machinery is a matter of some importance. The perfect interlocking of the two ends enables a secure fastening to take place, which renders the belt equal in strength at this point to any other portion of it.

Steel or Iron for Tin and Zinc Coating.

The *Metal Worker*, in speaking of the "pin-holes" in tinned andterne plates, and scaling of the zinc coating on galvanized sheets and pipes, says: Our readers are generally familiar with the argument about pin-holes, and know that the source of the difficulty has never been satisfactorily determined. One of the many causes to which the trouble was ascribed was the use of steel in the place of wrought iron. The question was argued in various ways, some saying that foreign matter in the steel interfered with the pickling and prevented the perfect coating of the plates, so that in places there was only a thin skin of tin unattached to the plate, and when this was abraded corrosion rapidly ensued. Others said that the pickling acid nested in the particles of carbonaceous scale, and kept up the work of corrosion after the plate was coated. One of the most plausible suggestions, however, was that the difficulty lay with the texture of the steel itself, that it was too fine grained a material in comparison with iron, and the surface was so hard and smooth that there was no opportunity for that superficial alloying which is supposed, rightly or wrongly, to constitute the bond between the black plate and the coating. The fibrous nature of iron, and the somewhat roughened surface, lets the tin soak in, if such an expression may be allowed, and makes a firm fastening with the base.

Whether this is the explanation of the pin-hole difficulty in tin-plates has not been definitely decided; but that there is trouble, not only with tin-plates, but with other forms of coated sheet metal that did not exist 20 years ago, is a complaint that reaches us from many sources. Speaking of the durability of tin-plates it is a common saying that in the old days unpainted bright plates on roofs in certain parts of the country lasted a quarter of a century and more without showing signs of rust. In the same dry climate, if the experiment were repeated to-day with the modern plates of leaving them unpainted, destruction would soon result. A corresponding complaint is made respecting galvanized iron of the present day, and the hypothesis is stated that the trouble is due to the use of steel, to which the zinc does not adhere as tenaciously as it did formerly to the iron. In proof of this it is pointed out that even the best coated galvanized "iron" will peel off sharply bent, and in furnace pipes and in other places where subjected to heat, the zinc will scale in a way it did not use to scale. We are told that the galvanized iron of the olden time was an excellent material for water tanks and would last an almost indefinite period, while if the modern product is used for the purpose it will often corrode almost immediately. And right here we might mention a curious thing about this whole enigma, and that is that there is no certainty about the matter. In some cases the galvanized iron, or tin-plates, as the case may be, will wear excellently, while the very next plate will corrode with surprising rapidity. The same complaint is made about the galvanized range boilers which are made of steel. Some of them show no traces of rust, while others will pit right through in a very short time. It is well known that enameled ironware requires a high grade of soft iron, and so far as we know, the enameled coating has not been successfully applied to steel plates.

The solution of this problem, however, should engage the earnest attention of the trade, and the quicker a new process is introduced the better it will be for the manufacturers and jobbers and for the whole sheet-metal working trade.

Scientific Progress.

Science in Medicine.

The recent address at St. George's, London was delivered by Dr. Bowles, of Folkestone. The lecturer commenced by welcoming the new students, and urging them all to preserve the tradition that "a St. George's man is expected at all times and under all circumstances to be a gentleman." The apprenticeship system was announced to be dead—defeated by the rapid march of science. This led to the main subject of the address, "the application of physics to physic." It was pointed out that all changes occurring in physiological and pathological processes formerly supposed to depend on that unknown quantity, "vital force," were really nothing more than the action of the recognized forces of nature on the organs and structures of the body. Coughing, sneezing, snoring, etc., were all shown to have immediate origin in physical conditions. Surgery is the proper application of the laws of physics; injured parts and broken limbs are kept at rest, dislocated parts are placed in their natural positions, redundancies are removed, and natural deficiencies often well supplied; crooked paths are made straight, and blocked and narrowed ones made patent; stiffened joints are made to move, crooked limbs put into shape, eyes are made to see that would not, and ears to hear that could not.

Surgery is a department of physics—a physical art. Medicine, formerly the region of the unknown and the happy hunting ground of quacks, is rapidly following in the same lines. The so-called practical man and the believer in dogmas and nostrums are rapidly giving way to minds trained in the laws of physics. Physiology, Medicine's forerunner and its handmaid, is steadily, step by step, and without prejudice elucidating the ways and doings of animal life. By instruments of the most elaborate and delicate nature, by patient and continuous observation, by anatomical and histological searchings, and by the application of the laws of gravitation, chemistry, heat, light and electricity, always by ways and means connected with physics, we are getting to understand better and more surely the movements and functions of respiration, of circulation and digestion, of secretion and excretion, and finally we hope to understand the most subtle and mysterious of all functions—the operation of the nervous system.

The lecturer then reviewed the rapid progress made in late years in the studies on which the medical art is based. Schroeder in Germany, and Pasteur in France, by their investigations on fermentation and putrefaction, and Chauveau on the particular nature of contagia, have opened up an entirely new world. We have now not only to study the causes as well as the changes of the disease in the body, but also the doings of the bacteria outside the body and within it. In view of the more scientific methods of modern pharmacology and therapeutics, students were cautioned against long and complicated prescriptions. Not a single drug ought to enter the body except under clear intention of what object it is to fulfill there. Compounds may be good cookery, but do not form scientific medicine. Finally students were warned against mistaken views of materialism. The students of the physical and biological sciences are emphatically the servants of nature. The man of science interprets the physical laws, and equally with the teacher of religion tells us of the greatness and grandeur of the Creator. Every discovery of the scientist can only tend to increase our wonder at the omniscience of the ways of God.

FACIAL EXPRESSIONS.—A close observer of the facial expressions of different individuals, says the *Optician*, will find a great variety in their delineation, based almost entirely upon the direction of the axis of vision. In children this axis is almost constantly parallel, producing the impression of thoughtlessness or the childish, innocent look. With increasing intelligence, the eyes lose the parallelism by being fixed upon objects of investigation. All affections of the mind are now manifested by certain motions and positions of the eyes, which become more and more convergent. The lurking look of the criminal on trial, the watchful scrutiny of the over-suspicious, the lustful look of the libertine, the piercing glance of anger, the rude gaze of the ruffian, and the fearful glare of the maniac, all are modifications of the same act, produced by an increasing convergency of the axis of the eyes. The eyes of a frightened person diverge; the wish to be far away from the place of danger causes the dilating of the pupils and the opening of the eyelids. In old age the axis of

vision again becomes parallel. The passions of former years are calmed, and the mind, in a contemplative mood, is now diverted upon its future distant home. At last the eye dies in the absolute parallelism of the axis of vision.

Glazing as a Science.

Glazing is being exploited as a science by Mr. Edward Atkinson, who in a recent talk told most interestingly of certain experiments he has conducted and experiences he has had in relation to the quantity, quality and usefulness of light as received through different sorts of glass.

At a meeting of the British Association, said Mr. Atkinson, an explanation was given of the Fresnel lens for transmitting light in one beam horizontally. Now, by reversion, a glass apparatus has been made to serve as a diffuser of light. You will be surprised to know that the amount of light that is absorbed by ribbed glass is ten per cent, and by clear glass is eight per cent; that there is only two per cent difference in the obstruction of light between a double-thick German clear and a fine-ribbed plate of the same thickness.

Now, through plain glass you get no diffusion; your light falls directly on the floor, and the clear sunlight falls on your looms or frames, if you are at work in a factory, making dark shadows; while with the ribbed glasses you get a diffusion through the room without a glare; you need no window shades and you have no dark shadow. Then, in the practical use of light, you will get a vast deal more with that ribbed glass without window shades than you will with the clear glass with the window shades which you must have on a south side.

An inventor, continued Mr. Atkinson, has worked on my theory of window glass. He has applied this idea to a conical glass, which is put under the arc light; with this he has done away with the glare and destroyed the shadow. You may have daylight from an arc light in your mills without the shadow and without the glare. The dispersion of light through the ribbed glass is relatively 64 per cent in horizontal planes to 0 per cent in plain glass.

THE SCIENCE OF METALLURGY.—We are glad to see that in the United States, as in Great Britain, the old idea that metallurgy is but a corner of engineering territory is gradually being exploded. In Germany, France, and Belgium the science of working metals has very properly long been severed from the art of the engineer, and with beneficial results to the metallurgical industries. In England the almost superstitious notion that a metallurgist must needs be an engineer, and vice versa, has long prevailed; and it is only comparatively recently that the erroneous impression has evinced signs of dissipation. To-day, even, there are numerous iron and steel masters whose hebdomadal dose of technical literature is derived solely from the old-fashioned engineering journals, which touch a metallurgical matter perhaps once a month, and even then consider that the space appropriated to what they are pleased to term "an out-of-the-way branch of engineering" is practically wasted. How can iron and steel masters possibly keep abreast of the times with respect to trade information, and of the technical advances which are constantly being made in their industry, when they see nothing of the literature which they ought to study—when they neglect the journals which are specially devoted to their interests, for the sake of periodicals which really do not profess to cater for them? "The science of metallurgy"—lately said Mr. Thomas Turner, the president of the South Staffordshire Institute of Iron and Steel Works Managers—"the science of metallurgy is of sufficient importance to the country at large, is itself established on a sufficiently firm and separate basis, and, I may add, offers sufficient pecuniary return to those who devote themselves to it, to warrant its separate existence in our leading institutions free from all restrictions or leading strings." Mr. Turner has, to quote a characteristic expression of Bluff King Hal's, "taken the right sow by the ear."—Iron.

PROFITS OF COPPER MINING.—The Calumet and Hecla, the great copper mine, has declared \$2,000,000 in dividends for the present year this making a total dividend paid to date of \$38,850,000. Assessments have been levied to the amount of \$1,200,000, and the capital stock is \$2,500,000. To those who have held the stock from the time the mine first began to yield a profit, the gain has been enormous, but there are comparatively few shares so held. Much of the stock has been purchased at a high figure, and upon its present selling price it pays only about 7 per cent.

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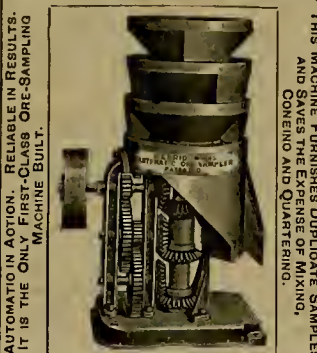
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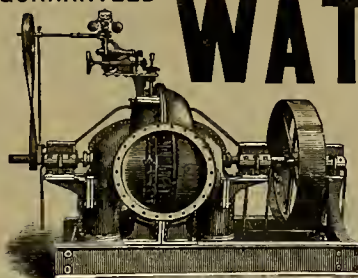
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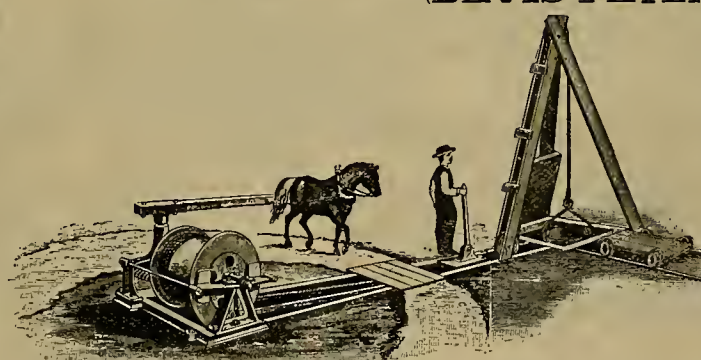
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Useful Information.

A Little Knowledge is a Dangerous Thing.

Mechanical, civil and other engineers who are not electricians cannot have the fact too strongly impressed upon them that work or power measured or represented in electrical terms is as much dependent on the volts as it is on the amperes, precisely as foot pounds of work depend on the feet as well as on the pounds. Amperes by themselves do not, therefore, represent any definite amount of energy unless accompanied by the volts measured between the two points of a circuit at which the energy is to be measured. Through the extended use of constant potential circuits it has become the habit of many to assume that the voltage is constant in all parts of the circuit and its measurement is, therefore, often dispensed with. It should be remembered that in all such cases the results are correct only to the degree to which the voltage may be assumed to be constant; that is, if the whole voltage may be 10 per cent out, the power calculated from the amperes and the assumed voltage will be uncertain to within 10 per cent. Only in incandescent lighting circuits, where the voltage is kept constant, through extreme care, at the consumer's end of the line, can it be assumed as remaining the same. On power circuits it may, and generally does, vary very materially. There are, moreover, many conditions which influence the voltage at the receiving end of a line—as, for instance, the speed of the generator, the resistances of the line, the fuses, instruments, etc., the current on the line (which, in turn, again often affects the speed and voltage of the generator), etc.—so that, to assume the voltage at the poles of a distant motor, while running, to be that engraved by the makers on the face plate of the generator, is almost as bad as assuming the boiler pressure in a steam engine test to be that for which the makers claim it to have been built. Unless the generator is very nicely over-compounded to suit that particular line, and unless its speed remains constant for all loads, even when a heavy load is placed on suddenly, it may cause very material errors to assume the voltage of a motor to be the same for all loads and speeds, and especially so at starting, when from its very nature it takes an abnormally great current. If the efficiency in a test is carried back to the poles of the dynamo, then the voltage at those poles must be taken, in which case the line losses need not be considered separately but will be included in those of the motor. In giving an efficiency, one ought always to state between what two points in a power transformation that efficiency is taken, otherwise it loses much of its value. Moreover, electrical measuring instruments are not always like scales and foot rules, but to be of value when used in tests they should be accompanied either, preferably, by recent or subsequent calibration, or else their style and the name of their maker should be given so that electricians can form some idea of their accuracy and reliability. In general it is advisable for mechanical and civil engineers to at least consult an electrical engineer before they make electric tests for publication if they want such tests to have their highest value.—Electrical World.

Increasing Use of Gas for Cooking.

At the last meeting of the American Gas Light Association, held in Boston, President White in his address made the following reference to the increasing use of fuel gas:

"But, having granted that electricity was a great spur to our side, and that its advance taught our patrons the need to them of a more profuse illumination than that which formerly answered their purpose, in my opinion the main cause of the advance shown in our gas output is to be traced to the pertinacity with which the introduction of gas for purposes other than lighting has been followed. I certainly am not wide of the mark in saying that many, even of our fairly large companies, are to-day, or have been during the summer season, sending out more gas, for purposes other than illuminating, than was sent out by them 15 years ago for every purpose. What is the inevitable knowledge that this brings to us? What is it that this so plainly shows us the future shall be? (1) That our field is to be many times larger than any that we ever dreamed could be our portion—that it is really bounded only by the limits of the habitable portion of the various communities to which we cater; (2) that we are growing closer every day to the 'poor man' as our ally. During the past two seasons, more particularly in the last, the use of gas for cooking purposes has increased phenom-

enally. Thousands of cooking appliances have been placed, and, in fact, in the city of New York, it is rather the rule than the exception now that architects, arranging for the construction of large apartment houses, prepare their plans for the placing of gas cooking ranges instead of coal ranges. New and ingenious schemes or plans for encouraging the domestic use of gas have been thought out and applied. Lectures by experts in the 'art culinary' have been given, with much attention to detail; repeatedly, even in our smaller cities, prizes have been put up for competition among the matrons and maids of several towns, and now comes Cincinnati, where our ex-president, General Hickenlooper, proposes to award \$500 in money prizes for competition by the female pupils in two prominent high-schools of that city.

"Ten years ago such schemes would have been regarded with, to say the least, marked disfavor; to-day they are accepted by us as legitimate and praiseworthy aids to the spread of our industry. This matter of increasing the day sendout will call for primarily but one important expenditure on plant account—the augmenting of holder capacity, and that expenditure will repay us double-fold, in that it will insure such capacity for all needed purposes, either by day or at night, enabling us to work more economically over the entire time in our generating plants. Here, too, it may be said that in this respect an auxiliary water-gas plant will be of advantage. I am not unmindful of the fact that differential rates have played an important part in the spread of the use of gas for purposes other than lighting, nor do I lose sight of the fact that the steady and gradual reduction all around in the prices of gas—a positive evidence that gas engineers are wide awake to the betterment and closer working of the plants in their charge—is going on."

Measurement of Light.

A beam of light has two other qualities besides that of illuminating a dark surface. It can easily be shown to possess more or less heat rays; also, that if certain compound substances are interposed in its path chemical decomposition takes place. Were the three portions of the beam, viz., the thermal, the luminous, and the actinic or the chemical rays always united in the same proportions, we should have no difficulty in constructing a photometer accurate in its measurements and independent of the want of sensitiveness in the eye; for we could on the one hand use a thermometer, or a thermopile and a delicate galvanometer; or on the other hand a piece of sensitized paper such as is used in photography. But unfortunately the proportions vary considerably.

Tyndall has ascertained, as the result of a long series of carefully performed experiments, that the luminous rays from several sources of light bear but a small proportion to the obscure or nonluminous rays, the exact proportion of the former being, from

An oil flame.....	3 per cent.
A gas flame.....	4 " "
A white-hot spiral.....	4.6 " "
An electric arc light.....	10 " "

The arc light appears here as the richest in luminous rays; it is also the richest in actinic rays, but the poorest in thermal rays. The various proportions differ, however, to some extent with different carbons, etc. The experiments demonstrate that, if either the thermal or the actinic rays are to be utilized for ascertaining the luminosity of electric lamps, they can only be compared together, or among themselves; they cannot fairly be compared with an oil or gas flame.—Electrical Age.

The Language of the World.

Some interesting statistics have been compiled by a Frenchman respecting the different languages spoken in various parts of the world. He states that the language in which Shakespeare and Milton wrote was then that of less than six millions of human beings. French was the mother tongue of at least thirty million people at a time when English was spoken by less than sixteen million, and fifty millions of French-speaking people were living when the revolution broke out in 1789. Between 40 and 50 years ago the English language equaled the German in the number of those who spoke it, and now the latter is left far behind.

German is now spoken by 10,000,000 persons in the Austro-Hungarian Empire, by 40,000,000 in the German Empire, by 40,000,000 in Belgium, and by about 2,000,000 in Switzerland. German is also spoken by about 2,000,000 persons in the United States and Canada, giving a total of about 60,000,000 who use the German language. French is spoken by the 38,000,000 inhabitants of

France, by 2,500,000 people in Belgium, by 200,000 in Alsace-Lorraine, by 600,000 in Switzerland, by 1,500,000 in the United States and Canada, by 600,000 in Hayti, and by 1,500,000 in Algiers, India, the West Indies and Africa, in all about 45,000,000. English is spoken by 37,000,000 persons in the British Isles, by probably 57,000,000 of the 60,000,000 inhabitants of the United States, by 4,000,000 persons in Canada, by 3,000,000 in Australia, by 3,700,000 West Indians, and by 1,000,000 in India and other British colonies, bringing the total of the English speaking race to over 100,000,000.

Ethnology of the Eskimos.

A clear and pleasant account of the Eskimos appears in recent numbers of *Das Ausland*, from the pen of Fridhuf Nansen, the celebrated explorer of Greenland.

From their close similarity wherever found, and from the slight differences in their dialects, he believes them to have developed from some small and homogeneous stem in comparatively recent times and to have spread along the coasts of the icy sea. He expresses some doubt as to whether they occupied the southern extremity of Greenland when it was first discovered by the Northmen. The point from which they spread he believes to have been somewhere on the shores of Behring Sea or Behring Straits. In this he differs from Dr. Rink, who places their earliest assignable abode in the interior of Alaska, and still further from Mr. Murdoch, who, with greater probability, would locate it about Hudson Bay.

Nansen's description of the appearance, habits, and arts of the East Coast Eskimos is both amusing and instructive. He found them, in spite of many nasty habits, attractive in character and of good mental ability—all the better, the less they had been subjected to the influence of European instruction and religion. One of their curious superstitions is that they will not touch their hair, in the care of which they take great pride, with any object made of iron, not even to trim it. This recalls similar objections to that metal in the rites of ancient Rome and Egypt. Physically he describes them as a well-made race, quite of the average European height, the young women sometimes good-looking. The general tone of this article is highly favorable to the stock.—Science.

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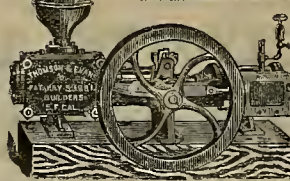
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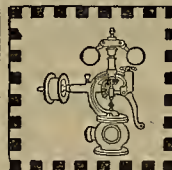
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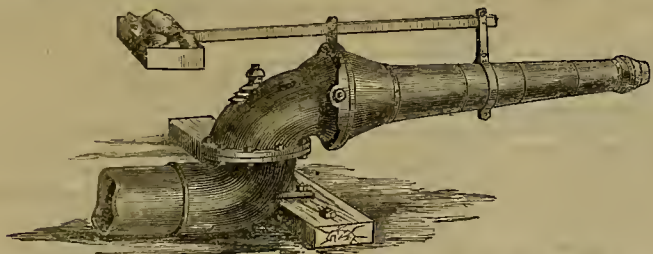
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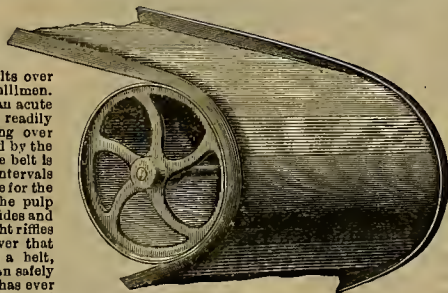


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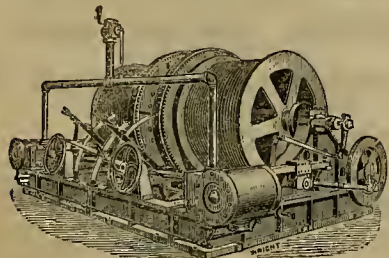
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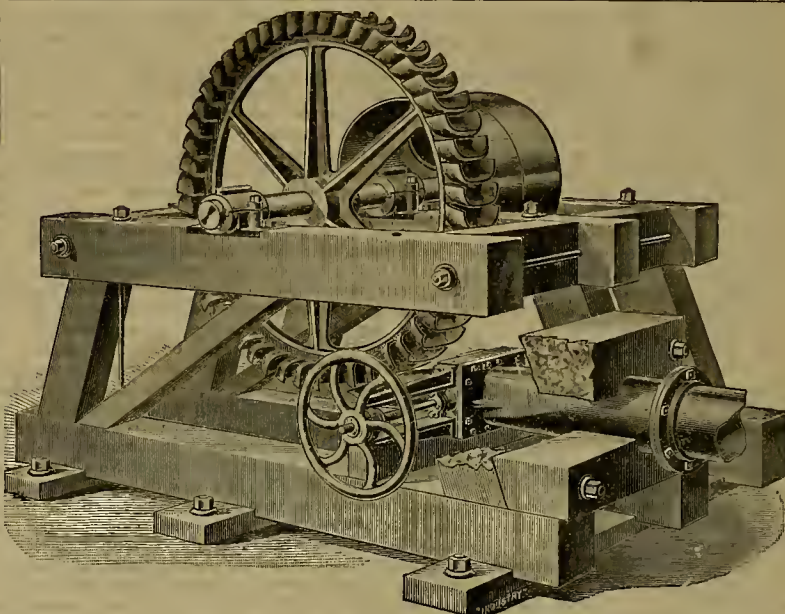
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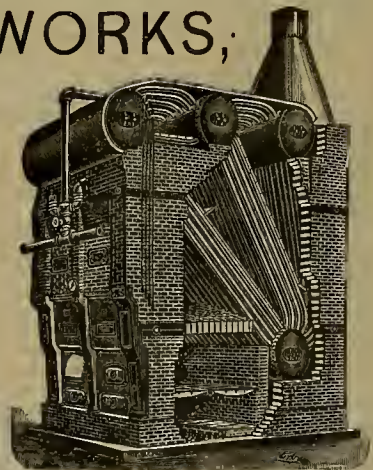
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Local Streetcar Line Extensions.

Many changes are to be made during the coming year in the streetcar systems of San Francisco. Old lines will be remodeled with cable or electricity for power, and many new roads will be built. The Western Addition and the southern part of the city will have many new lines and old ones will be extended. The lines and extensions of the Market street system alone will involve the employment of a great amount of labor. Mr. Joseph L. Willcutt, secretary of the company, states that all of the new lines and extensions are to be begun as soon as the routes are graded and prepared for the substructure. On Mission street, near Thirtieth, 50,000 yards of grading has to be done, and as soon as those interested complete this work the Mission road will be extended to the county line and to other and adjacent districts.

A beginning of the proposed improvements and extensions has been made on Kentucky street, from King street to the carhouses at the Potrero. A double track is being laid with heavy rails, and will be completed to the carhouse within two weeks. The old tracks will then be torn up and the street where they are now laid improved. The line will ultimately be extended west to Fifteenth avenue, South San Francisco, just as soon as the roadway is in proper condition to lay the tracks.

For the present the Kentucky street line will continue to use horses as the motive power, but at an early day this system will be discarded and electricity, either by the trolley or storage methods, will be substituted. For three weeks past about 500 men have been employed on this line. Subsequently the company promises to extend the line to Market street, via Fifth. The total length of this branch is three and half miles.

The next work to be done will be the changing of the Mission-street from horse to electric-power, and the only thing that is delaying the work is the delay in the grading at Thirtieth street. The road will be entirely a new one. All of the present rolling-stock of the present line is to be discarded and new bought. It is to be extended to the county-line and to have several lateral branches, and will make transfers wherever its line crosses the tracks of the same system. A branch is to start from Cortland avenue and run to Butler street through California and Richland avenues to a junction with Mission, thus accommodating the residents of the Holly Park district. The length of the Mission-street line and its branches will slightly exceed ten miles. The plans insure the completion inside of six months.

From Thirtieth street the Church and Fillmore street cable line to North Beach will run. Work will be begun as soon as material arrives, and the whole road is to be built just as substantially as the Geary-street. The rails are to weigh 71 pounds per yard and the length of the line will be 4½ miles.

To be built with the Mission is a branch to be driven with electricity, which will connect at Mission and Twenty-ninth streets and run to Noe, a distance of half a mile.

At the corner of Mission and Potter streets will be the terminus of a new cable system to be built on the same substantial plan as the rest and on the same general plan. This branch will run along Potter to Market street, across Page street, thence to Masonic avenue and Frederick street, where it runs west to Golden Gate avenue and terminates at Golden Gate Park. Length, two and a half miles. This line will be driven from the cable-house at the corner of Valencia and Market streets.

Starting at Seventeenth and Castro streets, a new cable branch will be run across to Devisadero street, to Lombard, thus making the second crosstown line connected with the Market-street system and making four altogether, exclusive of the one projected by Senator Fair. The Devisadero branch will be two and a half miles long.

Connecting at Kentucky and Solano streets an electric line is to run along the latter thoroughfare to Santa Clara street, thence up Sixteenth and Seventeenth streets to Carl and Frederick streets to First avenue and the park. Part of this branch will be run as a cable line. At Solano street this branch connects with a line to Market street up Sixth or Seventh streets and at Potrero avenue.

Another connection will be made with a line extending south to Twenty-second street, thence to Chattanooga, to Twenty-fourth, to Hoffman avenue; total length of this line and branches, eight and three-quarter miles.

Another cable line will intersect at Fill-

more and Turk streets, to run along Turk to First avenue and D street and thence to the park; length, two and a half miles.

The total of the new lines which the directory of the company says will be in operation by a year from this date is thirty-four miles, and at a low estimate means an expenditure of over \$3,000,000.

The company, Mr. Willcutt stated, is studying with great minuteness the development of electricity as a mode of propulsion for streetcars, but no electrical system so practical as the trolley has yet demonstrated its ability to fulfill the necessary requirements. It is hoped that some new storage-battery system will be devised so that an experiment as to its merits may be made on the Kentucky-street branch, and the company is prepared to adopt any plan the promoters of which may prove its practicability. For the present a trolley system will be used.

Where The Block System Fails.

THE tremendous volume of passenger traffic on our thousands of miles of steam railroads every day in the year makes the subject of proper protection of running trains from danger of collision with other trains on the same track a matter of the greatest importance. As is well known, the best protection yet afforded in this respect is that furnished by the block signal system, in which the road is subdivided into sections of such a length that it is impossible to give up an entire section to a single train so long as that train is passing through it. It is well known by those who have given any attention to the subject, that the very best block system becomes absolutely worthless if the signals which are automatically displayed are not implicitly obeyed by engine drivers. Experience has shown that a very large percentage of engineers are ready to take large risks even when the signals indicate that there is danger in running past them. A case in point is the rear end collision on the Central Railroad of New Jersey at Greenville, N. J., a few days ago. In this case two trains were dispatched from the station in Jersey one minute apart. Both trains were running at a high rate of speed, and both were behind time, owing to a somewhat dense fog prevailing at the time. The train in the lead, owing to the supposed accident, came to a standstill just beyond the signal post which marked the entrance to one of the 2000 feet blocks into which the entire road is divided, and which are protected by the Westinghouse electro-pneumatic signals. The distance or caution signal was 2000 feet back, that is, upon the same post with the home signal at the entrance to the preceding block. The following train came along at a high rate of speed and could not stop until a rear end collision with the preceding train had taken place. In this case the caution signal told the engineer of the following train that the train ahead of him was in the next block, and he understood well enough that his speed ought to be decreased, so that he would be able to stop before entering the block, 2000 feet ahead of the caution signal. As it was, he disregarded the caution, and being behind time, took the risk, expecting to find the block clear, and continued at the ordinary speed, even though the dense fog prevented him from seeing the train ahead until he was almost upon it. The point of all this is that the block system as at present operated gives ample protection only when the signals which it displays are strictly obeyed. Just here an important advantage would be gained by the substitution of electric power for steam in the operation of trains at high rates of speed, for in this case the automatic signal system could compel the engine driver to obey the signal by cutting off the current from his train as soon as he had passed the distant cautionary signal. Under these conditions, providing the blocks were of sufficient length, it would be impossible for a rear end collision to occur, as a system of automatic switches might be arranged so that a dead section of the line would intervene between any two moving trains. An effort has been made to secure the same results in steam railroad operation by equipping the locomotive with an apparatus by which upon passing a cautionary danger signal the throttle is automatically closed by the action of a solenoid through which the circuit is closed as the signal is passed. In this case, however, each locomotive must be equipped with the apparatus, while in the case mentioned above the equipment would be entirely out of the engineer's control and would be a part of the line equipment rather than an accessory to the electric locomotive.—Electrical World.

A MAGNESIUM FLASHLIGHT for light-houses is being tested for the U. S. Light-

House Board by Maj. D. P. Heap, in charge of the Staten Island station. The apparatus is devised by Prof. C. C. Schirm, of Berlin, and without the assistance of lenses or prisms, it is rated as equivalent to from 200,000 to 300,000 candle power. The apparatus consists essentially of a benzine-tank through which atmospheric air is drawn by a bellows and charged with gas; a vessel containing magnesium powder and pumicestone; clockwork for operating it, and a two-burner benzine lamp. A certain quantity of the magnesium powder falls at regular intervals, is taken up by the jet of gas-loaded air and is ejected from a wide tube and there ignited by passing over the flames of the lamp. The sudden flash thus produced has red rays in it, and can be seen for more than 8 miles on a clear night.

Car Lighting and Heating.

A comparative estimate, made by an English engineer, as to the cost of train lighting by gas, oil and electricity, says the *Electrical Engineer*, indicates that oil varies from one to two cents per lamp per hour, while the cost of plant was about five per cent less for electricity than for gas. This will be a welcome piece of news to railroad companies. The superiority of the electric light in giving more uniform illumination and not fouling the air commends it, irrespective of any question of expense. For heating, also, it will prove a competitor. When we consider the heat wasted in the chimney of stoves—the most common type of car heater—the lack of economy in electric heating assumes a less serious aspect than appears at first glance. A large saving is effected in developing the whole duty of the train from one furnace, and the electric heater expends all of its energy on the air to be heated, instead of imparting a small percentage to a metallic surface and sending the balance outside a car where it figures purely as waste. With steam heating the comparison would not be so favorable in cost, but convenience and safety would be strong factors in favor of electricity.

ELECTRIC STREET-INDICATOR.—A street-indicator for electric cars has been tried recently by the Albany Ry. Co., of Albany, N. Y., says the *Engineering News*. A similar method of announcing the names of cross streets, used for a time on the South Chicago cable roads, was worked by the gripman, and it was found to be more than the gripman could attend to. The Albany indicator is placed inside the car over the door, and consists of a series of narrow signs so arranged that only one is visible at a time. The indicator is operated automatically by a current from the trolley wire. A finger projects down from the trolley support wire near each street corner in such a way as to strike a trigger on the trolley-arm of the car. The effect of this is to turn the indicator one notch, so as to display the name of the street which the car is approaching, and ring a bell to attract the attention of the passengers. As these fingers are at some distance from the street corners, passengers are warned in time to notify the conductor where they want to stop. It is said to be a decided improvement on the oral method of announcing the names of streets, as there is no danger of misunderstanding the name, and it eliminates the frequent opening of the car door in cold weather. As soon as the car reaches the end of the line, the reversing of the trolley changes the mechanism of the indicator, and the signs are reeled off in reverse order.

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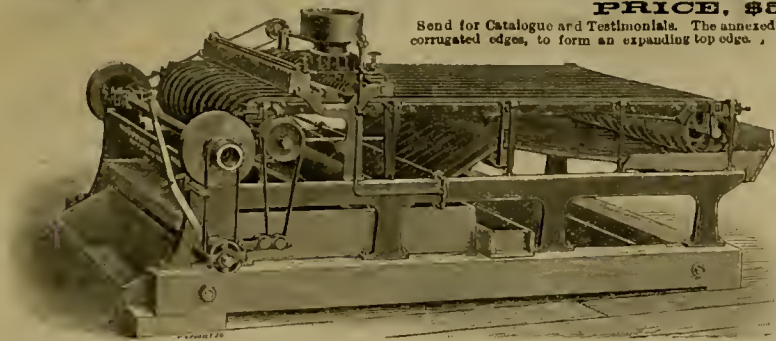
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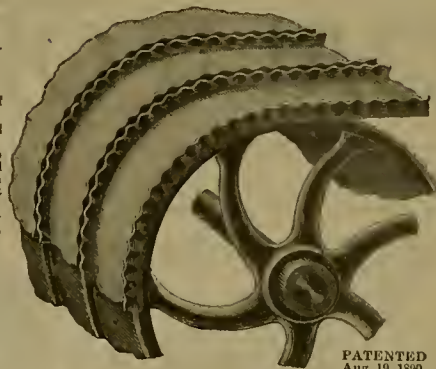


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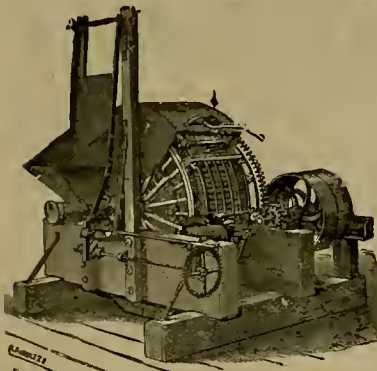
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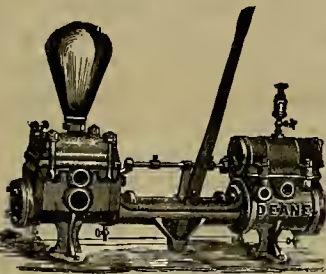
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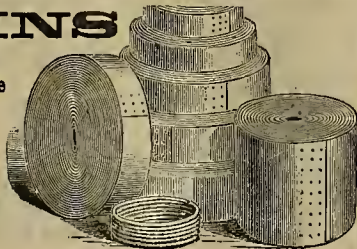
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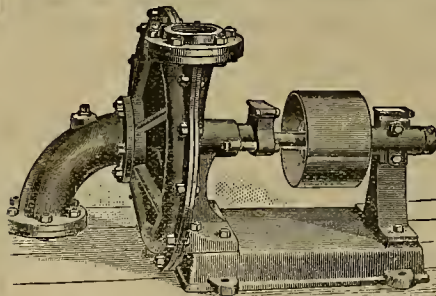
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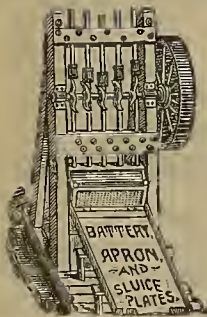
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW HOIST.—*Amador Ledger*, Dec. 29: We stated last week that the new managers of the Hardenberg mine had made a contract with Knight & Company for the repairing of the machinery in that mine. That was the determination at the time, but subsequently they have decided to put in an entirely new hoist, and Knight & Co. are at work upon that, expecting to have it completed in about ten days. H. E. Tripp, of the Tripp mine, near the Mokelumne bridge, is sinking another hundred feet in his mine. Supt. Tibbitts of the Albany and Belmont mines states that they had the water under control at the Belmont until the recent storm commenced, but that it was gaining once more. The Coyote gravel mine near Oleta, one day last week, took out a carload of gravel which produced \$3.70 and another which produced \$9.40, while the average is \$2 per car. D. O. Hughes of Sutter Creek, the superintendent, will go to San Francisco next week to make a sale of the property, or else make arrangements to put up a mill. The title of the Bunker Hill mine, which was sold by the sheriff six months ago and bid in by the workmen who had attached for \$11,000, had to be redeemed or pass into their hands on Wednesday last. On Tuesday evening, S. N. Knight telegraphed from San Francisco asking that the transfer be delayed for a few days. Frank Lan-hion circulated a petition among the claimants asking that the delay be granted. However, the deed was secured by John Mitchell, who represented the workmen. W. J. McGee will make the Bunker Hill employee a present in the form of \$73.863, being 50 per cent of the amount due them as wages for labor in the mine. B. F. Fisher has arranged with John Mitchell, representing the men, for the redemption of the property.

Fresno.

THE OLD DISTRICTS.—*Fresno Republican*, Dec. 29: The principal gold-mining districts in this county lie north of the San Joaquin river, and are known as the Potter Ridge, Fine Old and Quartz Mountain mining districts. The metalliferous belt trends northwest and southeast. The mines now being profitably worked in these districts are the Gambetta and Crystal Spring mines at Grub Gulch, the Swanstrom mine and McClelland and Melvin mine at Coarse Gold, the Waterloo and Last Chance mines at Fine Old, and the Lillie and Zebra mines near Quartz Mountain; all of the above-named mines are valuable properties and their records as gold-producers are assured. South of the San Joaquin river some quartz-mining has been done, with a fair degree of success. There are a number of properties there that could be made to pay handsome returns on investments, if they were placed under thoroughly practical management. Some years ago copper-mining was one of the leading industries of this county, and could now be revived and placed on a paying basis. The same mineralized zone or cupriferous belt on which is located the Union copper mine at Copperopolis, Calaveras county, traverses nearly the whole length of this county, having a trend nearly north and south, and dips to the east at an angle of 70 degrees from horizontal. The ores found in this belt are an oxide and carbonate of copper, which changes to a sulphide ore below water-level. Large quantities of copper ores have been mined from the Buchanan, Green Mountain and Ne Plus Ultra mines and shipped to England for reduction, but with our improved modern methods of treating this class of ores, many thousands tons could be extracted from the above-named mines and reduced to a profit at the mines. The Knepper copper mine, situated 27 miles east from Fresno City, is on the same belt. Although but a limited amount of developments have been made on it, it is a most encouraging prospect and worthy the attention of capital seeking investments in that class of mines. Only a limited amount of developments have been made the past season in the silver and iron districts of the county. "Representative work" was done at Mt. Raymond, on the silver and iron districts there; also at the Mineretts mining district, which has been thoroughly examined the past year by competent mining engineers in the interest of an English syndicate. What may be done in those districts in the future it is difficult to say; but it is quite certain that the construction of a railroad to these districts is one of the most essential features toward the successful development of those mountainous districts. The extension of the Pollasky or Raymond branch of the Southern Pacific to those districts would not only benefit them to a great extent, but would place the whole mining business of the county on a more healthy and substantial basis.

Lassen.

HAYDEN HILL.—*Bieber Tribune*, Dec. 29: Dan McLane, Superintendent of the Hayden Hill Tunneling Co., and Dan Ambrose, a shareholder in said company, report that the tunnel (which is seven feet in height and eight feet in width) is in about 600 feet, and that the prospects are very encouraging. This is an enterprise that should be encouraged by every citizen of this community.

Mono.

A MINING CONTRACT.—*Chronicle-Union*, Dec. 29: Sheriff Cody has let a contract to Harry Trevaathan to sink a combination shaft on the Rattlesnake and South Extension to a depth of 200 feet and a 15-foot sump. It will be a double-compartment shaft, and to be finished in eight months. This is a promising mine, several thousand dollars having been taken

out while merely doing assessment work. Sheriff Cody will have a better position superintending his Rattlesnake than being tax collector at \$300 a year.

Nevada.

Mt. GEORGE MINE.—*Telegraph*, Dec. 30: Very flattering reports come from the Mt. George mine. There is a three-foot ledge in it now and gold is seen all through it. The mine is on Rush creek, not very far from Nevada City, and is owned mostly by Grass Valley people.

OSBORN HILL MINE.—The above named mine has been bonded by parties in Grass Valley and in a short time active operations will begin on the property. The Osborn Hill is considered, by mining men who are familiar with the property, as one of the best mining prospects in this part of the country. It is admirably located, and in the early days considerable work was done on the mine. Considerable money has been taken from the mine, and a large ledge is there. Active work on the claim will soon begin and it will make times lively around Union Hill.

GRAVEL CHANNEL.—*Transcript*, Dec. 30: It is generally believed that the company who are now running a tunnel in the Hughes ranch, on the old Grass Valley road, will strike very rich gravel when they get the tunnel in. The last pan of dirt taken out of the shaft on the hill before the old company had to abandon it on account of the immense flow of water, prospected very big. The old company, not having the wherewith to put up heavy machinery, went to work running a drain tunnel. Being financially unable to proceed with the work, they bonded the property to experienced Grass Valley miners, and now the work is going ahead and there seems to be no doubt that a big property will be opened up there. The channel runs through the adjoining ranch, known as the Morgan ranch, now owned by the Nevada County Land and Improvement Association, and the new company has bonded the mining interest of the ranch from the association.

Plumas.

GRANITE BASIN MINES.—*Plumas National Bulletin*, Dec. 26: Granite Basin is a country which seems destined to come to the front as a mining camp. During last summer it attracted considerable attention, and the indications are that a greater degree of interest will be manifested next season. From Jo Peppin, who came up to Quincy Saturday, we gathered the following interesting mining items: Our readers have already been made acquainted with the rich developments recently made in the See & Jolly quartz mine, situated in Granite Basin. The owners have quit work for the winter, but will resume early in the spring. They now have a chimney with backs 30 feet deep. Into this they have drifted only 6 or 7 feet. The ore is extremely rich. About 75 tons of ore are in the small mill. The Black Prince, owned by Arthur Christie, is situated a half-mile from the mine above mentioned. Two men are now at work running a tunnel, which is in 450 feet toward the old Mexican chimney. Mr. Christie has just reached the ledge, which is two feet wide, "backs" 150 feet. As there is no mill on the property, Mr. Christie hauled the ore from this mine to the Morning Star mill, over a mile distant. The ore recently developed is estimated at \$20 per ton. Owing to the cold weather, Mr. Waldron is not able to run his mill on the Homestake property. The vein in this mine is about 20 inches wide, and the ore probably worth \$50 per ton. The mine has a good showing. During the past two years, Mr. Bowles has been running a tunnel in his mine, and has just reached the ledge. There is no mill on the property. The Colwell, owned by Sparks & Parker of Oroville, was patented about 16 years ago, and little development work was done until lately. The owners will devote attention to the property next season. The "Oliver Quirk" is a property owned and worked by Jo Peppin. Jo will sink a shaft next summer. The ore worked by him has yielded an average of \$15 per ton. Equally as good ore is below. Adjoining this, Mr. Peppin owns the Allen Chief & Christie locations. He has started tunnels to prospect them. The vein is only ten inches wide, but the ore from it crumbed as a prospect yielded \$50 per ton. The Granite is a quartz mine owned by a San Francisco company, of whose business at the Basin Mr. Jack Hall has charge. The owners expect to operate this mine next summer. The same parties also own two quartz locations at Cold Water. The Morning Star and Trenton are owned by Monroe and others of San Francisco. During the past season they built a lot of tramways, a house, and put in a large gasoline engine for hoisting purposes. Five men are now at work sinking on the ore vein, which is from two to three feet wide. It is proposed to sink the shaft 100 feet during the present winter. A 20-stamp mill, run by water, is on the property. The ore yields from \$8 to \$9 per ton, and the sulphurets nearly \$1000 per ton. Near the Morning Star, W. C. Grave owns two locations. A tunnel 300 feet long taps a foot ledge of \$10 ore. There is a five-stamp mill on the property. Mr. Early, of Oroville, owns a location into which he has driven a tunnel. He also put in arrastres, but has worked no ore yet. Of the Commercial, Jo Peppin has worked out one level, from which he extracted over \$5000, the ore paying him 25 per ton. He will run a 400-foot tunnel to tap the vein 60 feet deeper. From the level worked out, Jo sank a shaft, the vein increasing in width from 10 inches to four feet. He says he keeps this mine to take money out of when he needs it. The Harrison is at Coquet, nearly three miles from Granite Basin. It is owned by San Francisco parties. One level has been worked out, and a 1200-foot tunnel started to tap the ledge 200 feet deeper.

San Diego.

A STRIKE.—*Perris New Era*, Dec. 29: A strike of considerable magnitude is reported

in the Virginia mine, six miles west of Perris. The ledge has been uncovered to the width of the main shaft, and ore assays nearly \$100 per ton. Jerry Shay, the owner of the property, has recently bonded it, and it is believed that within the next few days the new purchasers will take hold of the mine. It is a good property and bids fair to become a leading bullion-producer.

Santa Barbara.

BITUMEN.—*Santa Barbara Press*, Dec. 31: John A. Puffinburg, the expert prospector in oils and mineral substances, returned to this city Friday last, after an absence of ten days at the newly discovered bituminous rock lode, near Punta Gorda station. Mr. Puffinburg had a force of half a dozen men assisting him in uncovering the deposit, which he discovered some six weeks since. He is very enthusiastic about the mine, claiming that it contains a practically unlimited supply of an exceedingly rich quality of bituminous rock. The mine is so located that it will be an easy matter to extract the ore, it being at the base of a gently sloping side-hill, with a deep canyon below, into which the clay and shale "strippings" can be conveniently thrown. The El Rincon Bituminous Rock Company, composed of J. A. Puffinburg, L. J. Girvin and M. M. Salmon, has been organized to prosecute the extraction of the ore, they having secured a lease of a ten-acre tract of El Rincon rancho, the property of Dr. C. B. Bates and Benigno Gutierrez, for a period of ten years. Work will be commenced shortly, and will be continued diligently, as the above named gentlemen are confident that they know a good thing when they see it, and that the El Rincon mine is one of those good things. This is but one of several valuable deposits of bituminous rock which have been discovered in this county within the past few years, and already the mining and handling of that ore has become a respectable industry, besides being a source of considerable revenue to the railroad company. The excellence of bitumen for street and sidewalk paving purposes is becoming more generally known, and, as the richest rock has been discovered in Santa Barbara county, the mining of the same will doubtless in the near future be an important adjunct to the already numerous resources of the county.

Shasta.

NOTES.—*Shasta Democrat*, Dec. 29: The late storm compelled Col. Lyons to temporarily cease work on the new tunnel he is driving on his mine on Rich gulch. Murray and Hull had to temporarily quit work on the Bunker Hill mine on account of bad weather. They have fine prospects in sight. Howkitt & Anderson, who purchased Vandever & Bullard's mine on Flat creek, have got their Huntington mill running in good shape. Another rich body of ore was struck in the Texas Consolidated last week in a winze in tunnel four. A foot wide of the ore will mill several hundred dollars to the ton. The gulches between here and Shasta and Buckeye district are alive with placer miners who are just now making good pay with rockers and sluice-boxes. The early rainstorm was a boon to the placer miners. J. Holman owns six placer claims on Flat creek, and is at work running a 1500-foot bedrock flume to work the ground through. This will enable him to work some rich ground that was skimmed over by former owners. The old Reid mine, under the superintendency of Col. Stephenson, is developing big. A very rich chute of ore was encountered last week in new ground penetrated by a shaft. This mine will be another producer in Old Diggins next year. The Clipper mine on Squaw creek is in the hands of creditors who consolidated their accounts and attached the property. We are informed that the creditors are running the mine and mill to get out their money, which aggregates about \$5500. Simonds and Spencer have bonded their fine prospect on Churn creek, near Churntown, to a San Francisco capitalist named Campbell, who pays down a handsome first installment and agrees to pay the balance in quarterly installments. Mr. Campbell will proceed to develop this fine prospect as rapidly as possible.

TUNNEL.—*Shasta Courier*, Dec. 31: Thomas Mitchell, who was in town this week, informs us that he and his brother Luke are running a tunnel for the Chicago Co., who own the Minnetota or old Levy mine on Spring creek. They are in 60 feet, on a 4-foot ledge of pay ore. The rock shows the "ore," and is getting richer as they push the tunnel. Hockett and Anderson, who purchased the Vandever and Bullard property on Flat creek, started up their Huntington mill a few days ago. The mill will use up ten tons of ore daily. The Calmet Co. is running a 200-foot tunnel on a promising location on Flat creek. J. E. Bell has suspended work at the Round mountain mining property. There has been plenty of water for placer miners the past few days, and they are making the most of it. Murray and Hull have been compelled to cease operations at Bunker Hill. The indications are that they will strike it in olden days did. Parker is pushing work on the mine he bonded on Muletown mountain, and has encountered some rock that assays very high.

Tuolumne.

QUARTZ INTERESTS.—*Union Democrat*, Dec. 31: Our quartz-mining interests seem to be looking up again. Outside capital is taking a hand in the development of some of our mining properties, and we confidently predict a mining boom shortly. We have within our limits gold-bearing veins without number, many of them exceedingly rich in the estimation of experienced miners, and under proper and economical management they can be made to yield rich results. In the past it has been the rule with companies to carry on their operations without regard to costs and expenses. With a few notable exceptions, not a mine has been opened and devel-

oped in a manner to place it in a paying condition. The lack of funds by our miners has worked against the successful development of some, and the lack of knowledge on the part of superintendents and managers has brought discredit on others. As monuments of extravagance and bad judgment, there are to-day in this county several first-class mills without a vein to feed them. Men rich and valuable mines now lie dormant which can be made to yield princely fortunes. First they must be opened and developed. There are many veins that have been worked to a limited extent, and that are known to be rich, that are now idle simply for the want of means to prosecute work on them. As a fact, nearly all of our quartz veins that were found to be rich when first worked and which were abandoned for a series of years, proved to be very profitable when subsequently opened and developed. This fact is becoming generally known and mining men are realizing that Tuolumne's gold fields are comparatively unworked, and the purchase of several of her mines is now being considered by capitalists, with favorable indications that sales will be made, followed by a vigorous and systematic working of the claims.

COLUMBIA.—*Union-Democrat*, Dec. 31: The old Tuolumne mine is looking good. Supt. Davis showed us some rock which disconcerts anything we have seen in a long time. They have not yet struck the main chute, but expect to within a short time. Expert D. Levy is very jubilant over the promising outlook. The Noonday is still sinking on good ore. Ed. Ogden and George Moran have struck a good prospect on the hill back of Morgan's house, near the head of Waterloo gulch. The Ham & Birney mine, three miles east of Columbia, will start up soon after New Year. The owners have recently put in a Huntington mill of large capacity to crush the 600 tons of ore already on the dump. Supt. McKenna, of Otto Kenig's mine, was in town this week. He says their prospects are very bright for the coming year, as they have the mine in excellent shape to work to great advantage. Smith & Fraser, of the Crystal Palace Cave, are washing out an immense pile of gravel which they drifted out during the dry season.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—*Virginia Enterprise*, Dec. 30: On the 1500 level the south drift leading to the stopes has been closed. This drift has a winze connection at the south end of our mine openings with the 1650 level, and is near the point where the fire started on that level. The closing of the south drift was necessary, as the good air coming from the 1500 level, north drift, turned and went down the Con. Va. shaft to the 1650 level, then south to the point of the fire, and upward through the upraise to the 1500 level; thence through the south drift to the Combination shaft, and upward to the surface. The result of the turning of the air current was to give good air to the burning stopes and increase the gas and smoke coming through the south drift to the shaft station on the 1500 level. The closing of the south drift has again turned the air, so that the combination shaft is upcast from the 1650 level to the surface. The 1500 level south drift is a level plane without any grade, and by building a three-foot dam across the drift at its mouth and turning in the water, it flows through the drift and down the upraise to the 1650 level. We feel certain this water will reach the fire and accomplish a great deal of good in a very short time. All our bulkhead work on the C. & C. side of the mine is in perfect order. The gas escaping through the Con. Virginia shaft has not increased, nor has it shown any decrease for the past three days. All ore extraction has been suspended during the week. Have shipped to the Morgan mill during the week from our ore bins 310 1270-2000 tons of ore, the average assay value of which, per car samples, was \$28.11 per ton. The average assay value, per battery samples, of all the ore worked at that mill during the week (816 tons) was \$29.15 per ton; 505 730-2000 tons of the ore worked was on hand at the mill, and, being of better quality than the ore shipped from the mine during the week, will account for the value of the battery samples being in excess of the car samples. Bullion shipped to Carson Mint, assay value, \$13,134.73. Bullion on hand in our assay office, assay value about \$30,500.

OPHIA.—1465 level.—The upraise started on the sill floor, on the north side of the crosscut run east from the drift run south from the Mexican sill floor to the Ophir ground, 101 feet below the sill floor of this level, has been carried up 7 feet; total height, 45 feet, continuing in porphyry showing lines of quartz.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 18 feet; total length, 413 feet; continuing in a porphyry formation with lines of quartz.

UNION CON.—900 level.—The joint Union Con. and Sierra Nevada west drift has been extended during the week 20 feet; total length west from the joint shaft, 2748 feet. The face is in porphyry and small streaks of clay, from which there is a flow of about five inches of hot water.

UTAH.—340 level.—West crosscut No. 3 from the north drift from west crosscut No. 2, at a point 195 feet in from its mouth has been extended 14 feet; total length 37 feet. The face of this crosscut is in a porphyry, clay and quartzite formation, showing some water.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 27 feet; total length 481 feet; face in hard porphyry. The joint Sierra Nevada and Union west drift, 900 level,

was advanced 20 feet; total distance west of shaft 2748 feet; face in porphyry and small streaks of clay, from which there is a flow of about five inches of water.

CHOLLAS.—Are repairing north drift on the 450 level, and retimbering main shaft between the 850 and 930 levels. Repairing to east crosscut, 160 feet south of north line, 930 level, is completed, and work resumed in the face of north drift from the crosscut.

POTOSI.—The raise from No. 1 crosscut, 1100 level is up 106 feet; the last seven or eight feet in porphyry, roof showing bunches of quartz. The east drift from Potosi winze station, 1000 level, is out 110 feet; face in porphyry. Extracted and sent to the mill the past week 370 tons 250 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 370 tons; on hand at mill, 71 tons 150 pounds. Average battery assays, \$26.47. Average car sample assays, \$33.31.

BULLION.—West crosscut, 160 feet north of top of upraise, 320 feet south of north line, 1300 level, is out 48 feet; face in soft porphyry. West crosscut from the northwest drift, 300 feet south of north line from Ward shaft, 1800 level, is out 115 feet; face in soft porphyry.

WARD SHAFT.—Joint Alpha and Exchequer east crosscut, on the north line of Alpha is out 155 feet; face in porphyry. The west crosscut, 300 feet south of north line of Bullion from Ward shaft, 1800 level, is out 115 feet; face in clay and porphyry.

ALPHA.—The joint Alpha and Exchequer east crosscut, on north line of Alpha, 1800 level of the Ward shaft, is out 155 feet; face in porphyry.

EXCHEQUER.—The joint Alpha and Exchequer east crosscut on north line of Alpha, 1800 level of the Ward shaft, is out 155 feet; face in porphyry.

SILVEA HILL.—The north drift on the 160 level has been advanced nine feet the past week; face in hard porphyry and small stringers of quartz, the car samples from which average about \$3 in gold. The southeast drift, 450 level is out eight feet; face in hard porphyry.

NEW YORK.—The south drift from the winze, 700 level is out 36 feet; the face shows 24 feet of ore, car samples averaging \$35. The west crosscut, 55 feet north of the shaft, 850 level, is out 56 feet; face in quartz yielding low assays. Are extracting from the stope above the 650 level 10 cars of ore per day, car samples averaging \$30. Shipped to the Washoe mill the past week 163 tons 1190 pounds of ore; on hand at mill, 60 tons; average battery assays, \$36.27; average car sample assays, \$37.60. Shipped to the Carson Mint 276 pounds of crude bullion.

HALE & NORCROSS.—We continue retimbering main shaft above the 700 level. Main Incline—Are making the necessary repairs, and are retimbering incline above the 1800 level, 1800 level. Advanced No. 1 west crosscut 16 feet; total length, 255 feet. The face at this distance reached the west wall and work was discontinued in this crosscut. West crosscut No. 3 was advanced 17 feet; total length, 192 feet; face in porphyry, showing some quartz. Advanced No. 4 west crosscut 16 feet; total length, 44 feet; face in quartz.

ANNES.—On the 420 level no work has been done in face of north drift run from east crosscut No. 1, north, during the week. Work has been confined to retimbering and repairing main north drift.

BEST & BELCHER.—200 level—During the past week the northwest drift has been advanced 22 feet through soft porphyry and quartz; total length, 108 feet. 300 level—West crosscut No. 2 has been extended a total distance of 105 feet and discontinued; face in porphyry. Started west crosscut No. 3 from top of upraise No. 1, which was carried up from the 1000 level, and advanced same 12 feet; face in porphyry.

GOULD & CURRY.—200 level: West crosscut No. 5, 435 feet from main west drift, has been advanced 20 feet through porphyry and stringers of quartz; total length 197 feet. West crosscut No. 6 from main north drift has been extended 9 feet; total length, 45 feet; face in quartz. On the Sntro tunnel level, the joint north drift with Savage Co. has been advanced 15 feet during the past week; total length, 759 feet; face in very hard porphyry.

EAST BEST & BELCHER AND NORTH GOULD & CURRY.—Are drifting from East Best & Belcher toward North Gould & Curry. Going through porphyry with favorable indications in the face.

OCCIDENTAL.—The upraise from south drift, 750 level, is up 51 feet and continues in ore of fair grade. The main north drift, 750 level, has been extended 17 feet; face in hard quartz giving low assays. Crosscut No. 2 in Zedig drift, Sntro tunnel level, has been advanced 16 feet; total length, 87 feet. The face is in clay and porphyry.

Ferguson District.

HARR KNOCKS.—Pioche Record, Dec. 29: Ferguson district, a few months since our El Dorado, is experiencing some hard knocks. The forfeiture of the April Fool option some time ago and the nonresumption of work there, is followed by a forfeiture of the Magnolia bond and a stoppage of work on that property also, which has always been regarded as the mainstay of the camp. While the Magnolia is admitted generally to be a good prospect, a man is not justified in going wild over it. No particular change has occurred in its appearance for some time past. The last and final payment on the property, of \$42,500, would have been due on the 15th of next month. The main shaft on the claim is down about 140 feet, and to properly prosecute the work deeper would necessitate the erection of a whim or steam hoist. With supplies of all kinds difficult to obtain, this would occupy some time—three weeks at least—and the bondholders asked for 60 days further time in which to prospect

the claim after the erection of the hoist. Some of the locators agreed, while others wanted a bonus of \$10,000 for the privilege. In the opinion of the bondholders, the property did not warrant this, and on Friday last Supt. J. L. Powell, then in charge, stopped all work and turned the mine over to the original locators. With all work stopped on the Reed tunnel, and no active work going on in the April Fool claim, the district is correspondingly dull and quiet, and will probably remain so until new deals can be effected, or new discoveries are made there.

Yellow Pine District.

ORE PRODUCERS.—Pioche Record, Dec. 26: That the interest now centering in the Yellow Pine district, in this county, is not without a good mineral foundation may be forcibly illustrated by a review of the properties there, which at this time are regarded as ore-producers—the claims, in fact, which will be relied on, without further discoveries, to supply the 200 tons of ore a day required by the incoming branch road from Gold. A number of immense lead deposits exist in the district, among the foremost of which comes the Mountain Top group, situated some 24 miles southwest of Good Springs and embracing nine claims. The Mountain Top claim itself has been sunk on for but 15 feet, exposing ore for 10 feet, the ledge or ore body being six feet wide and is a nearly horizontal vein or deposit in limestone. The ore is mostly galena and lead carbonate, with a siliceous gangue running 40 per cent lead and 12 ounces silver per ton. Twenty-five tons of ore lie on the dump. The Mountain Top extension, adjoining, is in the same formation, with a three-foot ledge. Twenty-five feet of ore is exposed on this claim, and the deepest workings are but 50 feet. The ore runs 50 per cent lead and 25 ounces in silver, and 25 tons lie on the dump awaiting shipment. On the Lookout claim more work has been done; the ledge here is the same as in the Mountain Top, and is four feet in width. The deepest workings are 60 feet, while altogether 70 feet of ore is exposed. The grade continues to improve, carrying 35 ounces silver and 40 per cent lead. Two hundred tons lie on the dump. The Copper & Lead, another claim of this group, of the same character of ore as above, has a six-foot vein sunk on to a depth of 75 feet, with 20 feet of ore exposed, which runs 50 per cent lead and 20 ounces silver; 100 tons are extracted here ready for market. The West Side and Ruby silver claims are also of this group; both show ore from one to three feet in width, the ledge being a bed vein, with limestone walls, dipping to the west at an angle of about 15 degrees. The deepest workings are but 10 to 15 feet below the surface, but 50 feet of ore is exposed on the west side and 250 on the Ruby Silver, averaging from 35 to 40 per cent lead and from 20 to 35 ounces in silver per ton. Sixty tons are mined here and await shipment. The Volcanic has a larger vein, but is much broken up and is much poorer. Though it has only been scratched on top, the ore is exposed for 250 feet. The ledge is composed principally of quartz and calc spar. The ore averages 14 per cent lead and 14 ounces in silver. The Galena and Chicago claims, which complete this group, have a similar vein to the West Side and Ruby Silver, running from one to five feet in width. The Galena has a 75-foot shaft, with 50 feet of ore exposed, while the Chicago is not more than uncovered. The ore in both claims is clean galena and lead carbonate, running 70 per cent lead and 40 ounces silver. About 60 tons are extracted. A conservative estimate of the probable output of this group, on the developments already made, is 100 tons of ore a day, and every indication goes to show that it might be continued for an indefinite length of time. The Oklahoma and Full Moon claims, two other good lead properties, are situated about six miles southwest of the springs, and will produce 20 tons of shipping ore a day from the start. The ore is found in a nearly horizontal deposit or vein in limestone, and runs about 40 per cent in lead and 30 ounces silver. Forty tons are ready for shipment from these two claims.

ARIZONA.

PECK MINE.—Cor. Prescott Courier, Dec. 29: The sawmill started at the Crowned King today and will saw 60,000 feet of lumber. The quartzmill will start up in a few days. There is now enough water to run. Work has commenced on the main shaft at the mine, and will sink 500 feet. Very rich ore is being taken out of the Eclipse mine, owned by Luke & Luke of Phoenix. Several tons of \$600 silver rock have been taken out lately. The Del Pasco mill will also be running in full blast in a few days. A big lawsuit has been commenced in the district court which will rival the celebrated Bond-Luke suit. The suit is brought by Mendibles and S. Mott against Ernst Arnaz, the well known young mining man and politician, and B. F. Joslin, to set aside a deed that Arnaz and Joslin hold for one-half of the Western Star mine. The mine is one of the most promising properties in this district. All of the burro pack trains have left this camp on account of the late snow storms, the snow being 18 inches deep on top of the Del Pasco. Several placer miners are now at the Cave creek placer mines, with fair results.

MOHAVE COUNTY NOTES.—Miner, Dec. 30: Frank Hamilton has a couple of tons of ore from the Mississippi mine, Wallapai mountain, awaiting shipment to the Colorado smelters. John Barry sent in a couple of tons of rich concentrates from the Minnesota mine, near Chloride, this week, and will ship them to the Pueblo smelters. Tiborcio Padillo has three men at work on the old Rainbow mine in Cedar and is taking out considerable ore. He has about 100 sacks on the dump and expects to make a shipment next month. There are six men at work on the Pittsburgh mine, Chimehueva mountains. The property, owned

by Monaghan & Murphy, is showing up finely with development and considerable ore is being extracted. Two carloads of concentrates were hauled down from the C. O. D. mill Wednesday by Brown's ore teams and were unloaded on the depot platform preparatory to loading on the cars and shipping to Denver. Messrs. Galigher, Sanfley and Marshal have sold one of their claims to Ed. Phenix, the purchaser paying \$1000 for the claim. This property adjoins the Bonita mine, belonging to the White Hills Company and is a good-looking prospect. Jas. Penberthy came down from the American Flag mine, Wallapai, mountains, yesterday. He informs us that there is now on the dump, sacked up and ready for shipment, nearly a carload of ore. Mr. Penberthy says there is a good body of ore in sight awaiting extraction and that if silver would come up to gold in value he would soon take out ore enough to make him independent for life, but at the present disgraceful condition of silver it is impossible to make a large percentage of the ore pay, owing to the heavy transportation charges. The ore has to all be packed out on burros, over a rough mountain trail, a distance of 15 miles, before it can be reached by ore teams, and taking everything into consideration, the ore must run away up into the hundreds before it can be handled profitably by the owners.

A RICH STRIKE.—Tombstone Epitaph, Dec. 24: The T. M. & M. Co. has been sinking a shaft for a week past on the west end of the Northwest claim near the line that divides that claim from the triangular claim owned by Jas. Young and O. C. Smith. At a depth of eight feet they struck the ore body which is a continuation of the Smith-Young ledge. On Monday they sacked 20 sacks of 400-ounce ore, and the chimney appears to be an immense one. This body of ore also extends onto the Sweet Nut. Jnd Cummings, who is working near by on a claim just across the gulch, has the same ore body. It is, without doubt, one of the largest and richest ore bodies struck in the history of the camp, and has caused some old-time excitement among mining men.

LOWER CALIFORNIA.

TO DEVELOP THE AURORA.—San Diego Union, Dec. 27: It is reported that Messrs. Russell & Rhodes, owners of the Aurora mine at Alamo, have succeeded in organizing a company to develop the mine, and that work will soon be started on a larger scale than ever. Mr. Rhodes' recent visit to England is thought to be in this connection. The Aurora's total output of gold is unknown to any but the owners, but actual shipments since manifesting has been in vogue have been over \$200,000 in gold, and circumstances indicate that a half million would be more nearly the total. The gold was taken from drifts not more than 150 feet in depth, and the mine can hardly be considered more than a prospect. It is understood that arrangements have been made whereby Russell & Rhodes donate the output of the mine for a certain time toward its development, against a stated cash capital of the newly interested parties. This report, if confirmed, will be good news to Alamo, meaning a new lease of life on a large scale, when now only a few chlorides are at work.

UTAH.

THE SAN JUAN PLACERS.—Aspen Times, Dec. 29: A dispatch was received yesterday at the office of the Denver & Rio Grande road, stating that horses and wagons are being rendezvoused at Dolores for the use of trains crossing the country to the mouth of the San Juan. Pack animals are being utilized, and outfits of all kinds are for sale. One enterprising firm is offering passage to the goldfields in wagon at \$20. It is reported that 1000 adventurers are tramping across the mountains and deserts in a scramble to get in before all the good ground is taken up. Tenderfeet passing through the Navajo country are advised to secure an Indian guide and to be prepared to be self-sustaining for a siege of two or three months. The demand for correct maps of the region is unprecedented. Engineer Aulls, who recently braved the rapids of the Colorado, says he found the map issued by Hayden to be accurate in every detail. The map men of the railways are sparing no effort in getting out maps showing the shortest and quickest route to the placer beds. J. F. Wehner, manager of the Henrietta mine in the Henry mountain district, was a caller at the Rio Grande Western headquarters yesterday. Mr. Wehner is on his way to London, Eng., to negotiate for the sale of the mine. He states that he has prospected the entire region where the placers are said to be located. "There is plenty of gold in the eand of the Colorado and San Juan," said he, "but the trouble is the placer beds lie so high above the river bed that they cannot be worked without the aid of machinery costing from \$60,000 to \$100,000 for each plant. The hydraulic system will have to be applied before placers will yield up their treasures." Speaking in detail, Mr. Wehner said that it is possible there are placers along the river where it will pay for the miner to haul water in wagons for washing out the gravel. He cited a plant in operation in the Henry mountains, where the dirt is hauled to the water and there washed out. "With regard to claim-jumping," continued he, "I have no doubt there are a number of claims upon which assessment work has not been done for several years. Those claims are jumpable according to law and will doubtless be gobbled up before spring." In describing the Henry mountain district, which covers an area of 30 miles each way, the visitor said: "The district was discovered by a party of prospectors from Grand Junction about a year and a half ago. A number of mines have been opened and it is believed by many of us that the district will become one of the best in Utah. The ore is free-milling gold ore. Samples have been tested running into thousands of dollars. A fine stamp mill

is now in operation on the Bonita park property. The vein in the Bromide mine averages twenty-two inches in width, while the Rio Grande mine has a 44-foot vein, a shaft 70 feet deep, and a tunnel 115 feet long. Last summer bullion to the amount of \$3151 was taken out of the Bromide." On November 30th a meeting of miners was called, which was attended by 33 men. J. F. Drake was chosen secretary, and the district was formally named the Henry Mountain mining district. The Bromide mine has an elevation of 9000 feet. So far as can be learned in this city, no man who has gone into that enchanted region has yet returned. It was along this particular stream that the cliff dwellers ages ago made their homes. Denver people are certainly leaving the city for the new fields, but the great majority of them are trying to keep their movements from the public. S. H. Brownlee, of Green river, was in the city yesterday purchasing saddles, blankets and tents for a party of friends who expect to leave Green river on Wednesday next for the new fields. To a reporter for the *News* the gentleman said that the Rio Grande Western had made arrangements with the leading outfitters of Green river to send all people from that point over to the San Juan, and for this purpose a big lot of saddle ponies are now being gathered together. From Green river to Dandy crossing there are ranches every 10 or 15 miles, but after crossing the Colorado river the country is nothing but a desert. Some experienced mining men, who refuse to divulge their names, are organizing a little expedition to explore the unknown land. While these people, of course, want gold, that is not all they are after, as instructions are to make a special search for copper and asbestos.

WASHINGTON.

SWANK MINES.—Cor. Ellensburg Capital, Dec. 30: Placer-mining has just shut down for the season, as there is about two feet of snow here and more falling all the time. About the only mining going on at present is underground. A. B. Morrison and Harvey DeZang are sinking on one of their quartz claims on Bonanza gulch. They are down about 40 feet and have a five-foot ledge of free-milling quartz in lime and slate, the assays showing from \$5 to \$35 per ton. J. H. Price of Williams creek is still working, and has on the dump 40 or 50 tons of \$30 rock. Mr. Price has what is going to prove one of the best properties in the camp. J. T. Brien is taking out some very good rock from his new discovery on Williams creek. He will continue to take out quartz all winter, and just as soon as spring opens will run it through an arrastre. This rock has assayed as high as \$4000 per ton, the average being up in the hundreds. Treet, Johnson & York on Mineral Hill are at work on the Golden Phoenix, and when spring opens will have a big lot of rich ore to grind in their arrastre. The Swank Tunnel Co. has a tunnel in on its claims 150 feet, and is going to crosscutting to strike the main ledge. This is the finest piece of work ever done on the Swank. It was done by H. H. Cole and cost the company about \$6 per foot. The company is incorporated with J. H. Wilson as president and J. G. Boyle secretary. Ford, Kanp & Smith last week struck the main ledge on the Buck Horn, on which they have been crosscutting all summer. Their main tunnel is in nearly 200 feet. They have uncovered three veins of free-milling quartz, one of 18 inches, one of 6 feet, and the last and best is 7 feet wide. It is 12 feet from the first to the second and 18 feet from the second to the third. The last is what is called sngar quartz, free-milling, and goes about \$40 per ton. Quite a number of claims have changed hands this fall and winter at prices ranging from \$250 to \$4000. In fact, all properties on the Swank are looking up. One of our citizens holding some Swank bedrock flume stock was offered last week a ten per cent advance on what it cost him. He declined the offer.

Wanted, A Partner

With capital sufficient to develop a gold mine in Shasta county, California. The property is located in the gold belt from which a large amount in gold is being extracted. The mine is showing well so far as work owned, being from 8 to 12 inches in rich ore. The company owns a mill and water rights, with U. S. patent. Plenty of fine timber on the ground. This is an exceptional opportunity for capital. Address, "SHASTA," this office.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

OCCIDENTAL RAFTING CO. Capital stock \$2,000,000. Directors—W. P. Plummer, H. R. Robertson, Fred M. Wilson, James Logan and J. J. McIntyre.

PACIFIC TRADING CO. Directors—U. J. Lyon, Lamartine R. Fnlida, A. P. Lorentzen, Daniel Vincent and William B. Bradbury. Capital stock, \$250,000.

PACIFIC HOME SECURITY CO. Directors—Wm. H. H. Hart, Sumner W. Engbee, Thomas W. Nowlin and Aylett R. Colton. Capital stock, \$10,000.

PACIFIC ASBESTOS CO., Los Angeles. Capital stock, \$25,000. Directors—T. J. Hannon, A. H. Busch, F. T. Griffith, J. D. Hoff and R. F. Vetter.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC COAST BORAX COMPANY, San Francisco, Dec. 31, 1892. At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 25) of One Dollar (\$1.00) per share was declared, payable TUESDAY, January 10, 1893, at the office of the company, No. 101 Sansome Street, Room 28. Transfer books will close January 5, 1893, at 3 o'clock, p. m.

ALTON H. CLOUGH, Secretary.

Market Reports.

Financial and Commercial Review.

SAN FRANCISCO, Jan. 5, 1893.

The London Silver Market.

Last August, fine silver fell to 37 1/4 per ounce in the English market, the lowest up to that time during the present century. Subsequently, the value rose to 39 1/4. Again on the 21st of December the quotation fell to 37 1/4, or 1/4 lower than last August, and of course the lowest in over 90 years. This was shortly after the adjournment of the International Monetary Congress at Brussels at the conclusion of long and unsatisfactory deliberations. The price on the 1st of December was 39 1/4 and at the close of the same month 38 1/4. The extremes for fine silver in the London market for the year were as follows:

1892.	Highest.	Lowest.
January.....	43 12-16d	41 12-16d
February.....	41 13 16	41 2 16
March.....	41 10-16	39
April.....	42 2-16	39 4-16
May.....	40 10-16	39 11-16
June.....	41 2-16	40 1-16
July.....	40 1-16	39 1-16
August.....	39 1-16	37 14-16
September.....	38 5-16	38 2-16
October.....	39 14-16	38 2-16
November.....	39 4-16	38 12-16
December.....	39 3-16	37 12-16

The extremes for December, 1891, were 44d to 43 1/4d and for the year 48 1/4d to 43 1/4d. What is in store for this metal this year is hard to tell. The usual monthly purchases of 4,500,000 ounces silver by the Government will be resumed to-morrow.

Prices of Silver in December.

The following shows the daily quotations of bar silver in the London and New York markets during December:

Date.	London.	New York.
1.....	39 3-16d	\$0 85 1/4
2.....	39 1/2	85 1/4
3.....	39	85
4.....	38 3/4	84 3/4
5.....	38 3/4	84
6.....	38 3/4	84 1/2
7.....	38 3/4	84 1/2
8.....	38 3/4	84 1/2
9.....	38 3/4	84 1/2
10.....	38 3/4	84 1/2
11.....	38 3/4	84 1/2
12.....	38 3/4	84 1/2
13.....	38 3/4	84 1/2
14.....	38 3/4	84 1/2
15.....	38 3/4	84 1/2
16.....	38 3/4	84 1/2
17.....	38 3/4	84 1/2
18.....	38 3/4	84 1/2
19.....	38 5-16	84 1/2
20.....	37 15-16	82 1/2
21.....	37 15-16	82 1/2
22.....	38 1-16	82 1/2
23.....	38	82
24.....	38	82
25.....	38	82
26.....	38 1/2	82 1/2
27.....	38 1/2	82 1/2
28.....	38 1/2	82 1/2
29.....	38 5-16	82 1/2
30.....	38 5-16	82 1/2
31.....	38 5-16	82 1/2

The London quotations are per ounce 925 fine and 1000 fine in New York. The highest and lowest prices for the month were as follows:

	London.	New York.
Highest.....	39 3-16	\$0 85 1/4
Lowest.....	37 15-16	82
Difference.....	1 1/4	3 1/4

The closing prices for the month were 3/4d and 2 1/4c lower in London and New York, respectively, than at the opening.

In November the London market opened at 39 1/4d and closed at 39 1/4d. The highest price in that month was 39 1/4d. The New York market opened at 84 1/2c and closed at 85 1/4c, the highest being 85 1/4c.

During the past month private advices reported a sale of silver in the London market at 37 1/4d (21st), which was the lowest ever known in that market. The lowest price, according to the public dispatches, was 37 15-16d, as above given. On the 22d, 23d and 24th of the month the New York market stood at 82c, the lowest price ever recorded there.

Exports of Specie.

During the final week in December, 1892, the exports (exclusive of specie) from the port of New York were \$7,235,354, making for the year \$392,712,818, as against \$388,270,774 in 1891.

QUICKSILVER.—Tuesday the Newburn took 175 flasks of quicksilver to Mexico. There is no change in quotations, and little inquiry.

BORAX.—The market is quiet at quotations.

ANTIMONY.—The last Panama steamer took out a consignment of antimony, making about the only event worth noting during the week. Nothing is doing, the market partaking of the quiet usually experienced in metals at this season.

LEAD.—Local jobbing quotations for lead are \$4.25@4.37 1/2 per hundred for domestic. At this season the inquiry is naturally light and sales slow, and the market now shows no exception to the rule.

TIN.—For Australian local jobbing quotations are 22 1/2 cents per pound.

COPPER.—No transactions in copper are recorded. Local quotations are steady at 13 1/2 cents.

The Mining Share Market.

There is no special activity to note in the stock market, the year having opened rather quietly on Pine Street. News from the Comstock is, however, encouraging. Tuesday's *Virginia Chronicle* said: "The engine at the Con. Virginia was started up this morning and a number of men put to work repairing the water pipe running down the shaft, which was broken in several places near the 1300 level. The shaft being an upcast the effect in the breaks of the water pipe, whereby the water dropped to the levels below, retarded the escape of gas through the shaft. The volume of gas in the mine has decreased perceptibly. Three shifts of four

men each are at work on the 1500 level, and two more men will shortly be added to each shift. Superintendent Lyman expects to be able to open the stopes on the 1500 level before long, when the force of miners will no doubt be materially increased."

On the 3d inst. the connection between the east and west drifts on the 1000 level of the Potosi mine was made. There is now a good circulation of air, and some energetic prospecting work will be done. Drifting south on the 1000 level of the Potosi toward the Bullion will begin at once.

The following companies had cash on hand on the 1st inst., according to the financial statements filed this morning: Alpha \$148,624.62, Best & Belcher \$242,012.02, Bodie \$57,042, Bulwer \$7894.10, Bullion \$8199.74, Caledonia \$1674.39, Chollar \$522.12, Coptic \$3800, Crocker \$865.95, East Sierra Nevada \$7 to Gold & Curry \$13,978.97, Julia \$3803.10, Kinnick \$2062.99, Lady Washington \$5227.30, Mexican \$14,328.10, North Commonwealth \$2058.10, Nevada Queen \$97.58, Occidental \$9572.57, Peer \$381.62, Peerless \$1784.88, Syndicate \$1280.31, Savage \$2702.72, Scorpion \$3378.81, Silver Hill \$3858.41, Sierra Nevada \$13,558.44, Silver King \$2701.32, Standard Con. \$37,293.59, Union \$7052.84.

The following companies were in debt: Belle Isle \$2217.57, Belcher \$20,154.32, Commonwealth \$26,824.49, Challenger \$9522.20, Con. Imperial \$3372, Crown Point \$14,793.16, Confidence \$12,122.75, Con. Cal-Virginia \$4,296.66, with \$40,081.35 in bullion unsold; Con. New York \$7617.40, Del Monte \$21,612.83, Exchequer \$2500, Hale & Norcross \$8886.69, Independence \$256.66, Navajo \$2525.34, North Belle Isle \$7223.68, Ophir \$4562.71, Overman \$12,365.24, Potosi \$56,099.01, Seg. Belcher \$6975.98, Utah \$14,443.82.

San Francisco Metal and Coal Market.

Per lb.	English, D.	@ 13	STEEL.	@ 18
Refined, in car lots	@ 7 1/2	B's Diamond tool	@ 18	84
Powdered, do.	@ 7 1/2	Pick & Hammer	@ 18	10
Concentrated, do.	@ 7 1/2	Machinery	@ 18	6
All grades jobbing at advance		Toe Calks	@ 18	4

COPPER.

Bolt.....	@ 22	—	B. V. steel grade	@ 18 3/4
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Sheathing.....	@ 22	—	1420, spot.....	@ 5 87 1/2
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Do, jobbing.....	@ 13 1/2	Do roofing, 14x20	@ 5 87 1/2	5
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Do, wholesale.....	@ 14	Do roofing, 14x20	@ 5 87 1/2	5
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Fire Box Sheets.....	@ 24	Do, do, 30x28.....	@ 11 75	5
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Bar, hms.....	@ 3	Spot B. D.....	@ 24	5
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Norway, hms.....	@ 4	Spot FROM YARD—PER TON		5
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PIO IRON.....		Wellington.....	\$8 00	5
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Eglington 3 ton.....	20 00	Greta.....	7 50	5
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Chicagoland.....	21 00	Nassau.....	6 00	5
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Am. Soft, No. 1.....	22 00	Gilman.....	6 00	5
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Oregon Pig.....	@	Seattle.....	6 00	5
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Puget Sound.....	20 00	Ocos Bay.....	5 50	5
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Olney Lane White.....	22 00	Cannel.....	5 50	5
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Langdon.....	22 00	Egg hard.....	2 00	5
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Thorncliffe.....	23 00	Cumberland, in sacks.....	15 00	5
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Gatsherde.....	22 50	Do, bulk.....	14 00	5
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Barrow.....	22 50	Walsend.....	7 25	5
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Carbide.....	22 50	Swich Split.....	7 50	5
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OHROME IRON ORE.....		Brymho.....	7 50	5
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Per ton.....	10 00	West Hartley.....	7 50	5
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LEAD.....		TO LOAD—PER TON.....		5
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Pig.....	@ 4	Australian.....	5 37 1/2	5
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Bar.....	@ 5 1/2	Liverpool.....	5 50	5
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Sheet.....	@ 7 1/2	Scotch Split.....	7 00	5
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Pipe.....	@ 8 1/2	Cardiff.....	6 75	5
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SHOT.....		Lehigh Lump.....	11 00	5
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Drop, sizes smaller than	B. W. of 25 lbs.....	85 Egg, hard.....	10 00	5
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Do, do, B and larger sizes	@ 1 1/2	West Hartley.....	7 50	5
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Do, tag of 25 lbs.....	2 10	English, to load.....	\$8 50	5
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Snack, Balls and "Chilled"	Do, tag of 25 lbs.....	2 10	Do, in sacks.....	@ 11 60
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QUICKSILVER.....		Cumberland.....	9 00	5
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Home trade, pr.....	41 50	42 00		5
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For export.....	35 50	46 00		5
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Eastern Silver Markets.

NEW YORK, Jan. 5.—The following are the closing prices the past week:

Thursday.....	32 1/2	82 1/2
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Friday.....	32 1/2	82 1/2
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Saturday.....	32 1/2	82 1/2
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Sunday.....	32 1/2	82 1/2
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Tuesday.....	32 1/2	82 1/2
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Wednesday.....	32 1/2	82 1/2
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DEC. 27, 1892.

488,922.—CAR COUPLING—Galloway & Cramer, Plainville, Or.

488,734.—CABLE TRAMWAY—J. L. Giroux, Jerome, A. T.

488,891.—HYDRAULIC ELEVATOR—C. I. Hall, S. F.

488,737.—SAFETY LOCK FOR GAS COCK—F. Lawrence, S. F.

488,971.—LAMP SUPPORT—D. F. Oliver, Oakland, Cal.

488,718.—CAR COUPLING—F. M. Ryan, S. F.

488,721.—BATTER CAKE MIXER, ETC.—F. Stempel, Alameda, Cal.

488,743.—BILLIARD TABLE—Scott & Wright, S. F.

488,723.—WATER WHEEL—Clark Taber, Sumpster, Or.

488,640.—CABLE—J. H. L. Tuck, Stockton, Cal.

488,746.—STEERING GEAR—H. L. Weitzel, Oakland, Cal.

The following brief list by telegraph, for Dec. 27, will appear more complete on receipt of mail advices:

California.—Nelson Evans and W. A. Henry, Ukiah, wagon jack; Thomas E. Fry, Nipoma, animal trap; Milton O. Godding, Monrovia, combined automatic thrasher, feeder and separator; John P. Lighthady, San Francisco, balanced slide valve (2); Antonin Sperl, Los Angeles, and J. Geemen, Cucamonga, portable fruit evaporator; Benjamin H. Stephens, Mendocino, device for raising loaded trucks; F. A. Westheimer, San Francisco, hoisting iron or tongs; Richard F. Wilson, Stockton, non-shrinking stove; Washington—Louise Austin, Whetcom, pinking shears; S. M. R. Gilbert, Seattle, gravel washer, etc.; Chas. P. Labro, Spokane, conduit for electric railroads.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ.	TAXES & SALE.	SECRETARY.
Alpha Cons M Co, Nevada.....	10	10c	Dec 29, Jan 24, Feb 7			O E Elliott, 309 Montgomery
California Iron and Steel Co, California.....	7	20c	Nov 25, Dec 31, Jan 23			F Tannas, 428 California
Challenge Cons M Co, Nevada.....	13	25c	Nov 30, Jan 4, Jan 25			C L McCoy, Mills Building
Chilton Cons M Co, California.....	1	50c	Nov 17, Dec 16, Jan 7			C O Ginn, Mills Building
Commonwealth Cons M Co, Nevada.....	10	10c	Nov 23, Dec 31, Jan 24			R R Grayson, 331 Pine
Confidence S M Co, Nev.....	22	75c	Dec 24, Jan 2, Feb 15			A S Groth, 414 California
Cora California and Virginia M Co, Nevada.....	3	50c	Dec 13, Jan 21, Feb 16			A W Hovens, 308 Montgomery
Con Imperial M Co, Nevada.....	34	30c	Nov 22, Dec 29, Jan 19			C L McCoy, Mills Building
Crown Point M Co, Nevada.....	63	25c	Dec 2, Jan 24, Feb 14			J Newlands, Mills Building
Del Monte M Co, Nevada.....	7	10c	Nov 22, Dec 27, Jan 10			J W Pew, 310 Pine
East Best & Belcher M Co, Nevada.....	3	20c	Nov 23, Dec 29, Jan 13			C H Mason, 324 Montgomery
Evening Star M Co, California.....	7	1c	Dec 1, Jan 12, Jan 31			J F Seville, 320 Sanson
Gold Mountain M Co, Cal.....	4	25c	Dec 21, Jan 23, Feb 15			J F Curtis, 325 Montgomery
Gold & Curry S M Co, Nevada.....	70	25c	Nov 22, Dec 23, Jan 10			A K Durbrow, 309 Montgomery
Jack Rabbit M & M Co, Nevada.....	25	25c	Dec 29, Feb 6, Feb 18			T Wetzel, 320 Sansome
Martin White M Co, Nevada.....	28	25c	Nov 25, Jan 15, Feb 20			K L Ross, 129 Sutter
North Belle Isle M Co, Nevada.....	21	10c	Nov 14, Dec 20, Jan 17			J W Pew, 310 Pine
North Gould & Curry M Co, Nevada.....	14	10c	Nov 21, Dec 24, Jan 15			C H Mason, 324 Montgomery
Russell Reduction & M Co, California.....	8	1c	Nov 14, Dec 19, Jan 16			J Morillo, 33 Geary
Silver King Cons M Co, Nevada.....	2	10c	Nov 22, Jan 3, Jan 15			W Ladd, 531 California
Siskiyou Cons Quicksilver M Co, California.....	1	1c	Dec 16, Jan 20, Feb 10			E F Stone, 306 Pine
Utah Cons M Co, Nevada.....	16	10c	Dec 13, Jan 19, Feb 9			A H Fish, 309 Montgomery
Yellow Jacket S M Co, Nevada.....	63	30c	Dec 6, Jan 10, Feb 11			W H Blaisvelt, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Argenta M Co, Nevada.....	Annual.....	331 Pine	Jan 9
Bismuth Cons M Co, California.....	Annual.....	M P Dodd, 310 Montgomery	Jan 10
Brinswick Cons M Co, Cal.....	Annual.....	J Stedfeld Jr, 309 Montgomery	Jan 12
Bullion M Co, Nevada.....	Annual.....	R R Grayson, 331 Pine	Jan 12
Con. Steamship M Co, Cal.....	Annual.....	F Lewis, Philan Block	Jan 16
Crocker M Co, Arizona.....	Annual.....	A W Hovens, 308 Montgomery	Jan 18
Iowa M Co.....	Annual.....	C B Higgins, 419 California	Jan 18
Lone Star M Co.....	Annual.....	A W Hovens, 308 Montgomery	Jan 21
Nevada Salt and Borax Co.....	Annual.....	H C Van Dyke, 319 Pine	Jan 21
Pacific Great Borax Co, California.....	Special.....	A H Clough, 103 Sansome	Feb 18
Shasta Iron Co, Cal.....	Annual.....	C B Morgan, 58 California	Jan 10
Sierra Nevada M Co, Nevada.....	Annual.....	E L Parker, 39 Montgomery	Jan 18
Silver King M Co, Arizona.....	Annual.....	J W Pew, 310 Pine	Jan 10
Utah Cons M Co, Nevada.....	Annual.....	A H Fish, 309 Montgomery	Jan 26

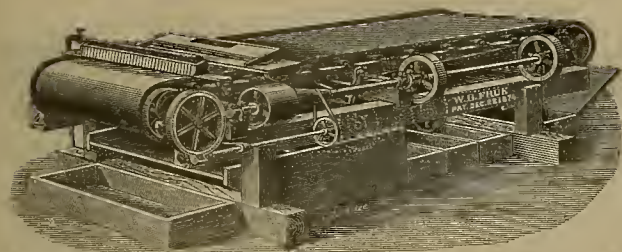
DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	P
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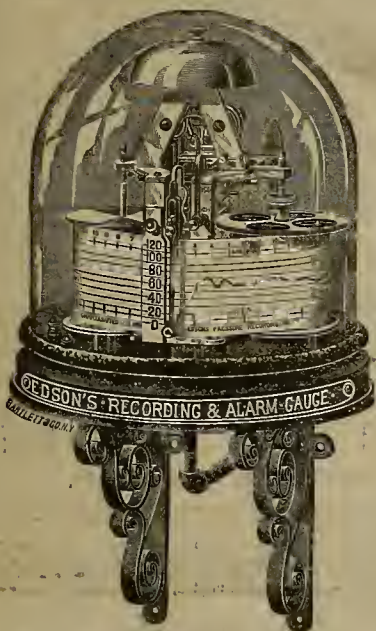
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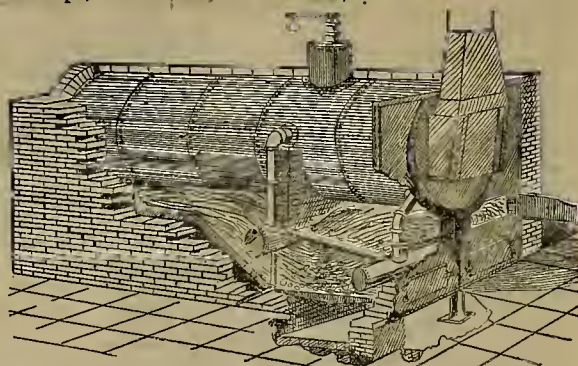
Ryan McDonald Hoisting Engines,
 Hoskin's Giants and Defectors,
 Brazelle's Hydraulic Governors,
 Sullivan Diamond Drills,
 Blake Damper Regulators,
 Direct Acting Hoisting Engines,
 Geared Hoisting Engines,
 Friction Hoisting Engines,
 Hydraulic Hoisting Machinery,
 Hand Winches,
 De Rycke Steam Separators,
 Conover Condensers,
 Band Rock Drills and Compressors,
 Webster Vacuum Heaters,
 Hawley's Smokeless Furnace,
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 Hunt's Rope Transmission,
 Water Jacket Smelting Furnaces,
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 Chlorination Works,
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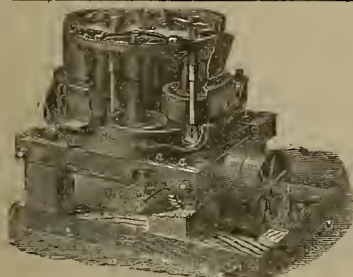
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VOL. LXVI. — Number 2.
OWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JANUARY 14, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Late Egbert Judson.

Egbert Judson, who died this week, was distinguished among the millionaires of this city as being an original investor in manufacturing enterprises instead of a cent-per-cent man. And not only did he invest his money in industrial enterprises, but he originated and established them, afterward taking an active personal interest in the conduct of their affairs. It has been unfortunate for the city and State that there were not more rich men like him in this respect.

He seemed to possess a remarkable faculty for organizing and building up manufacturing establishments, and his means has been such that wherever he has given his attention, it has brought the confidence of others who have been willing to put in their capital. He not only possessed great executive ability, but was always willing and able to take off his coat, go to work, and show how a thing should be done. There was nothing of the "kid-glove expert" about Mr. Judson, who was a plain man, but one with a great deal of practical experience and plain good sense. All who have been associated with him speak highly of his integrity, industry and ability.

Mr. Judson came to California in 1850 and went to the mines. After a year he went East and returned in 1852. It is said he started the first assaying office San Francisco ever had. In 1855 he became interested in the San Francisco Chemical Works and the manufacture of acid. Years ago he invested in hydraulic mines in Nevada and Butte counties, and was the first man to successfully carry water through a wrought-iron pipe passing down one side of a ravine and up the other under a 900-foot pressure. He made his own engineering calculations for this inverted siphon, and the credit of its success was wholly due to him. He was still interested in hydraulic-mining up to his death, being one of the principal owners in the North Bloomfield mines, the largest hydraulic mines in the State. He was the principal owner in the Kennedy mine, Amador county, now the leading gold-producer among the quartz properties of California. As showing Mr. Judson's willingness to advance a variety of interests, the following are given as a few of the enterprises in which he was a large owner: Judson Manufacturing Company; Judson Dynamite and Powder Company; California Paper Company; Western Fuse and Explosives Company; San Francisco Candle Works; San Francisco Chemical Works; California Pulp Works; Sather Bank; Pioneer Pulp Company; chemical works at Newark, N. J.

In the powder business of this city Mr. Judson was a most prominent factor. He was one of the originators of the Giant Powder Co., the first to manufacture high explosives on this coast. Not long after he invented and patented the Judson powder for bank-blasting, a substance which soon displaced others in gravel-mining work. The original high explosives were composed of nitroglycerin and absorbents; but this powder consisted of particles of black powder rendered nonabsorbent by a peculiar process, mixed with nitroglycerin so that the nitroglycerin remained on the surface. Only a small proportion of nitroglycerin was used, but the powder was found to be

peculiarly effective. The sales of the new product were immense, and the substance was patented all over the world.

Only a few years since, Mr. Judson organized the Judson Dynamite and Powder Co., and built very extensive works on the bay shore in Alameda county, the largest powder works at the time on the coast. In forming this company he associated with him some of the most prominent men and largest mineowners in this State, all direct-

which has been successful and profitable from its inception. It was somewhat surprising that at his advanced age he should start such a large new industry and his business rivals were not pleased at his efforts in this direction, particularly as they resulted in such a sweeping reduction of the products manufactured.

The exact amount of Mr. Judson's estate is not known, but it is doubtless between \$2,000,000 and \$3,000,000. He was an unmarried man and leaves the estate to his

four nephews and nieces, who are to receive the income for ten years, at the end of which time the property is to be divided. It is the desire of testator that the executors and trustees shall continue business jointly with J. L. N. Shepard for ten years. A codicil dated October 5, 1888, provides that the above request is not to be construed as exclusive of any other partnership or joint venture in which testator may be interested at the time of his death, and the directors are authorized to continue any and all business in which testator may be a partner at the time of his death, with the same powers as himself if living.

This codicil well illustrates the absolute singleness of purpose of Mr. Judson. He simply did this so that the men associated with him in business would be put to no inconvenience because he was taken away.

Active work was an essential feature of Mr. Judson's career, and he kept "in harness" until the end of his life, yet he was a man almost 81 years of age. At the time of the explosion of the Giant Powder works at Fleming's point he was a short distance away and jumped in his huggy to drive over to the scene. The horse ran away with him, going toward the fire. Just then the second explosion occurred, and Mr. Judson was thrown violently to the ground, being not many hundred feet from the magazine. He was permanently deafened in one ear and received some internal shock which undoubtedly hastened his death.

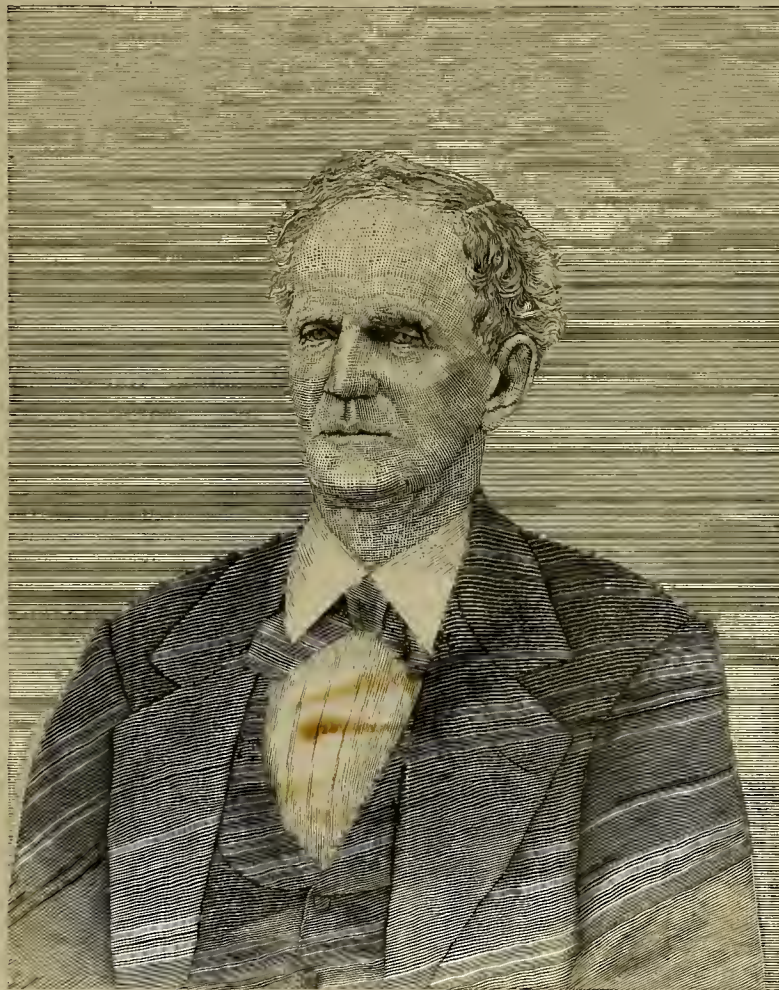
ANOTHER lost-mine romance comes from old Mexico. It seems that old workings of mines have been found near Ures, Sonora, where rich ore was recently discovered. Now observers jump to the conclusion that the long-lost mines

from which the Aztecs obtained their treasure have been found at last. It seems that prospectors would rather run after mines which have been once found and then lost than hunt up absolutely new ones.

THE mine of Santa Maria de la Paz, San Luis Potosi, Mexico, is reported to be in bonanza. The output is 5000 cargass per week of ore running between 10 and 11 ounces per carga in silver and carrying, besides, a fair ley of gold. The pay-roll and general expenses amount to \$6000 per week, and the net profits, also per week, range from \$25,000 to \$30,000.

THE tin mill at Hill city, South Dakota, is now running at its full capacity—250 tons per day. The separator of the metal is said to be satisfactory.

AT King, Colo., four miles from Cassio, a dust explosion in one of the chambers of the coal mine killed 27 miners.



THE LATE EGBERT JUDSON.

ly interested in the development of the mineral industry of the coast. Their idea of joining together to manufacture blasting powder was the result of their determination to avoid the payment of the high rates previously charged for explosives. This company soon brought the price of powder down from 18 cents to 12 cents a pound. Mr. Judson had previously left the Giant Powder Co. and disposed of all his stock in it.

Simplicity of habits and mind were marked characteristics of Mr. Judson. Notwithstanding his great wealth, he never asserted himself or sought for any prominence. If he had a weak point in business, it was that he was a little too frank himself because he thought other people were equally honest. It was a hobby with him that the enterprises with which his name was identified should become successful and advance the manufacturing industries of California. He thought more of this than of the money they would make for him. His last enterprise, the Judson Dynamite and Powder Co., was his greatest, and one

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Comment.

Mr. Voorhies has introduced a bill in the legislature providing for a uniform system of signals in mines in this State. It has been pointed out in the MINING AND SCIENTIFIC PRESS that there is a necessity for some uniformity in this matter. In different counties, and different camps in the same county, the signals used are such as the respective mining superintendents prefer. In consequence, men going from one place to another are liable to confusion in the matter of signaling or obeying signals and disasters frequently result. With a uniform system all over the State there would be less liability to accident than there is at present.

The miners of Tuscarora, Nev., and those of Austin, Eureka, Candelaria, Pioche, and even Virginia City, all in the same State, are in a bad way. A dozen other smaller mining towns and camps are also in a distressed condition owing to the shutting down of silver mines and the discharge of men. In every one of the camps the number of employed is comparatively few, and in some instances there is absolute distress. The men have been holding on in hopes of better times, until their money is expended and they can now get no work. Even if they can get away, there is no place to go where they can follow their vocation, as all the silver camps on the coast have more men now than they can employ. These Nevada silver miners are about in the same predicament as were the miners in the hydraulic mining regions of California when the gravel claims were shut down by process of law. They found their occupation gone, and for some years there was much distress, which to some extent still continues. Not only miners, but storekeepers, artisans, and all the people dependent upon mining operations, feel the effect of hard times in such cases. In some instances, cases of destitution are reported. These people have not brought this upon themselves by laziness or improvidence, but the conditions have resulted from the low price of silver and the consequent loss in mining operations. When the mines closed down and there was no work for the men, all sorts of business in the camps languished and no money could be made by any one.

The rush to the San Juan placers in Southern Utah still continues. A stage line has been put on this week between Flagstaff, on the Atlantic and Pacific R. R. (Santa Fe route), and the new placer fields. The stage trip will be made in three days. Some favorable reports continue to come in, and others less so. A Mr. Knebler, who was

sent out by the Board of Trade of Durango, Colo., has returned and says there is little to warrant the excitement. There is no scarcity of food, but there is some distress among those who went improperly equipped. He says no men are working along the river and many are anxious to return. In many instances men went in with nothing and are cursing the men who started the boom, as they gave up their positions in order to get into El Dorado, so called. This is only what was to be expected in an excitement of this kind. Those who are lucky laud the country, and those who find nothing curse it.

The U. S. Senate Committee on Mines and Mining has reported favorably to the Senate the Caminetti bill with Senator Felton's amendments. By the exertions of O. P. Berry of this State, who is in Washington, the following amendment has been adopted by the committee: "Any person or persons, company or corporation, their agents or employees who shall mine by hydraulic process in violation of the provisions of this act, shall be punished by a fine of not exceeding \$5000, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court." The word *must* has been inserted instead of *may* in Section 9 of the bill, thus compelling all companies to file a petition for permission to mine by the hydraulic process. Both these changes are obnoxious to the miners. In the penalty clause there should have at least been a proviso specifying that the penalty only applied to mines injuring the navigability of the rivers; but this makes it sweeping and covers all. There are many now mining without injury to any interest. The word *must* compels every hydraulic miner, whether he has his own restraining works or not, to petition for permission to work. Where they have already built satisfactory works, and are complying with the law, they should have been let alone. The bill as it has been changed, is not at all what it was when the Miners' Convention indorsed it, and it is not at all what the miners want. In the opinion of many, it will do the hydraulic-mining industry as much harm as good. A penalty clause was to be expected, but it should have, in justice, excluded all now conforming to the law and all who do no harm to navigable streams.

The Magnetic Variation at San Francisco.

Dr. Mendenhall, Superintendent of the U. S. Coast and Geodetic Survey, has authorized Prof. Davidson to publish for the benefit of surveyors, civil engineers and navigators the results of the late magnetic observations made by Mr. Fremont Morse, of the Coast Survey, at the Presidio station.

The Presidio station has been occupied by the Coast Survey parties since Davidson's first occupation in 1882, for the determination of the magnetic elements, especially for the variation of the compass which has nearly reached its eastern maximum limit. In former notices we have shown that the maximum would probably occur about 1893.

The observations are now made at this station yearly, or half-yearly, in order to be sure of determining closely the epoch of the maximum eastern variation.

This year the observations for the magnetic variation extended through five days in the beginning of November, and they give an average of 16° 40' 5" east, with a comparatively small probable error. This value is nearly five minutes of arc greater than the computed variation; and the observed value has been greater for the last three years. This indicates that the maximum variation will be several years later than predicted.

The observed value of the variation is the arithmetical mean between the greater variation of the needle about 7½ hours A. M., and the smaller at 1 o'clock, P. M. The average change in this period was 6' 9"; and by that amount the direction of a line would apparently differ if run by the compass in the morning, or in the afternoon.

The dip of the needle from five days' observations was 62° 28' 2", and the value has been nearly stationary for three years. The observed horizontal intensity was 5.4476; and the resulting total intensity computed from this and the dip is 11.78 English units, or .5433 dynes.

THE Magdalena placers, west of Hermosillo, Mexico, about which there is now some excitement, were discovered by two women, Mrs. Louise Leglerly and Mrs. Fortunata Ronslat, of the village of Magdalena. They were sharp enough to secure the title to 35 of the richest claims in the district, and are now outfitting them with machinery.

THERE is no abatement in the mining excitement near Ures, Sonora, over the rich gold finds made a few weeks ago. It is estimated the new camp now has a population of 15,000 persons, mostly Mexicans, with a few American prospectors from the southern part of Arizona.

Position of the Large Hydraulic Mining Companies.

It may interest, and perhaps surprise, some of the anti-debris agitators of this State as well as the miners to know that the Caminetti bill, which was indorsed by the legislature on Monday, is really being opposed, not encouraged, by some of the largest hydraulic mining companies of California. The Caminetti bill provides for a California Debris Commission, and regulates hydraulic mining in California. It is this "regulation" which these larger companies and richer hydraulic miners oppose. At the recent State Mining Convention, after resolutions indorsing the bill had been passed, some of these men endeavored to have the resolutions reconsidered. They were unsuccessful, however, the convention indorsing the bill by a large majority. The richer mining companies and the richer hydraulic miners have always been lukewarm about this whole miners' movement. Both the financial aid and moral support given by them to the State Miners' Association have been exceedingly small as compared with their interests. At the first inception of the movement they came in but finding they could not have a bill drawn up for Congress exactly as they desired, they became lukewarm and have so continued.

The majority of the members of the executive committee of the State Miners' Association are fair-minded men, who desire to see the great hydraulic mining industry of California rehabilitated on lines which give some justice to its opponents; by methods which are fair to both sides, and in a way that no man's property need be injured. They have bent their energies toward conciliating the opponents of the industry, and toward carrying out the promises made at the State Miners' Convention of January last. They asked the hydraulic miners to immediately desist from illicit mining and wait for Congressional action which might permit them to work legally. When they found they could get no broader measure than the Caminetti bill, they worked to get that passed, as it at least, legalizes hydraulic mining and places the miner who works in good faith, on a lawful basis in his operations.

The larger companies and more prominent (because richer) hydraulic miners do not like this bill, and would prefer to have it killed and rest on the decisions of the courts alone.

The great mass of miners in this State should understand this situation. There are on the executive committee of the State Miners' Association only a few who have a ten cents' worth of interest in any hydraulic mine in California. They are, at least, unselfish in devoting their time to the cause. None have received a cent of money for their time or labor; even the secretary has been without salary for six months past. The association is not for hydraulic mining alone, but that special interest being in the greatest trouble has been given the most attention.

The reason the larger companies object to the Caminetti bill is, that under the present conditions they can build restraining works in any way they like and run the mines to suit themselves, provided they let no slickens into the rivers. Under the Caminetti bill such works would come under the supervision of the Government engineers. Each company or individual must file a petition with the U. S. Commission, and the owners or companies must surrender to the United States the right and privilege to regulate by law the manner and method in which the debris resulting from the working of the mine shall be restrained.

In other words, instead of putting up such works as they like, the companies must adopt the plans of the U. S. Engineers, and conduct the mine as the commission dictates as far as restraining debris is concerned. Moreover, hydraulic mining, directly or indirectly injuring the navigability of the river system of the Sacramento or San Joaquin carried on in that region other than as permitted by the provision of the act is prohibited and declared unlawful by the Caminetti bill. The larger companies argue that under recent decisions they can continue mining in their own way provided they keep the debris out of the rivers; while under the Caminetti bill they must submit to Government control and direction in the matter of their restraining works.

There are quite a number of miners now operating in this State with restraining works, to their own satisfaction, the owners of which do not wish to be compelled to come under any outside authority, control or supervision, such as is enforced by the Caminetti bill. These are all large operations, and it is such companies as these that object to the measure now pending in Congress.

W. P. LIPP, of Wheatland, while prospecting at Nugget ravine, seven miles east of Wheatland, on Frank Hunt's land, found a large gold nugget which weighed 14 ounces, 13 pennyweights and 8 grains. It is valued at \$246. Grundy Hendrix, while working on the same claim about two years ago found another large nugget for which he received \$236.

The Legislature Indorses the Caminetti Bill.

In the Assembly on Monday last, Price, of Butte county, offered the following:

WHEREAS, The interests of the State of California demand an immediate solution or a satisfactory adjustment of the hydraulic and river interests in this State; and

WHEREAS, Two State conventions, composed of representatives of all industries therein, have so agreed, be it

Resolved, By the Assembly of the State of California, the Senate concurring, that the Congress of the United States be hereby urged to speedily enact the measure known as the Caminetti House bill, relating to hydraulic-mining and river improvements in the State of California, or some other measure which in the judgment of that honorable body will serve the purpose set forth in said Act.

Resolved, That the Governor is hereby requested to affix his official signature to these resolutions and cause a certified copy thereof to be forwarded by telegraph to our representatives and senators in Congress.

Mr. Price explained that the bill would come up in Congress on Tuesday, and for this reason he desired immediate action, as it was intended to give the California delegation in Congress all the moral support possible. Vann, of Colusa, and Glenn and Durst of Yuba, opposed the resolutions on general principles. Vann made a long speech about the horrors of slickens and fear of the resumption of hydraulic-mining. Anderson, of Sacramento, wanted further time to consider the resolution, and Miller, of Alameda, wanted to know what the Caminetti bill was. Price thought everybody in California knew that. He briefly explained that the bill was designed to provide measures for the resumption of hydraulic-mining without injuring farmers and other landowners. Shanahan made a strong and clever speech in support of the resolution. He said immediate action or none was demanded. The Caminetti bill was not calculated to pull down or destroy, but to build up, to develop the State and add to the prosperity of the people. He spoke of the opposition which the antidebris people had made to every measure relative to hydraulic-mining, and gave as an instance the bill repealing the law declaring the Klamath river navigable, which, though it affected only three counties that were in favor of it, was fought hard by the valley representatives. The Caminetti bill had been indorsed by the two mining conventions, and the press has been in favor of it. Congressmen Caminetti and Geary, who favored the bill, were elected by large majorities in ordinarily Republican districts.

Mr. Shanahan, of Shasta, made an earnest speech in favor of the miners. He said there had always been opposition to every measure for their relief that had ever been introduced into the legislature, whether it affected the farmers or not. He said he could count the opponents of the bill in the legislature on his ten fingers, and urged the immediate passage of the resolution. Mr. Thomas, of Nevada county, also made quite a lengthy speech in favor of the resolution. O'Keefe, of San Mateo, stopped the debate by insisting on the previous question, and the resolution was carried by a vote of 73 to 5. On motion of Shanahan the resolution was ordered printed, and was immediately transmitted to the Senate.

Mr. Ford, of Sierra, chairman of the committee on mines, introduced the resolution into the Senate. Senator Ostrom, who has always been opposed to hydraulic mining, voted for it. In explaining his vote he said: "I will vote for the resolution, believing the Caminetti bill to be meritorious for the protection of our navigable waters and the protection of the lands adjacent thereto, as the bill places the old subject matter of the debris question in the hands of the War Department. That department has, to my knowledge, never been accused of partiality, wrongdoing or boodling." The resolution was adopted with only eight dissenting votes.

This action shows that the people of this State are in earnest about seeing hydraulic mining resumed, if it can be done without material injury to the rivers or other interests. The Caminetti bill provides for this, and while it is not entirely satisfactory to the miners, it at least legalizes hydraulic mining and provides a means by which it may be carried on.

A TRAIN of burros coming from the Las Animas mine, Mexico, loaded with silver bars, has lost one of its number. The lost burro is valuable, as he has on his back \$5000 in silver bars. There is another chance for the prospectors who are always hunting up "lost mines."

THE recent reduction in force by the various mines of Park City has apparently created a dearth of mining news, for there seems to be nothing at all going on. The prospectors have nearly all knocked off, and very few plans are being laid for the future.

A FURTHER reduction in force took place at the Anchor mine, Park City, Utah, on the 1st, 16 men being laid off on that date. Matters were made still worse by the shutting down of the concentrator, which threw 18 more men out of employment.

EIGHT HUNDRED miners were laid off for the present at Aspen, Colorado, last week, in consequence of the low price of silver.

Foundry Notes.

The Joshua Hendy Machine Works, of No. 51 Fremont street, reports that business for the new year has commenced auspiciously, and that their sales since its advent comprise a large boiler and engine shipped to San Jose, Cal.; also one Erie center crank engine, Buffalo duplex steam pumps, 15 "Challenge" ore feeders, several thousand feet of lap-welded wrought iron tubing for irrigating uses; a number of giants for hydraulic mining work; one 5-foot "Huntington" mill with all of its accessories of ore feeder, concentrators, etc., shipped to Mexico, together with several mining cars. They have in process of construction and shipment several "Climax" band-saw mills for use in the lumber districts of this and our sister States, and, as well, many other of their specialties, such as horse whips, etc.

The Pacific Laundry Machinery Co., under the management of Mr. J. E. Chappell and measurably under the control of the Joshua Hendy Machine Works, report that they have received the contract for furnishing the Veteran Soldiers' Home at Yountville, Cal., with a full equipment of the latest improved forms of laundry machinery; that they are further supplying a complete plant for use in Oakland, and another to be erected in Haywards; another complete new plant for use in Albany, Oregon; and still another for the St. Nicholas hotel in the Doe building, on the corner of Hayes and Market streets.

The Vulcan Iron works of this city have closed a contract with the Gambrinus Brewery Co. of Portland, Or., to furnish a 35-ton Vulcan horizontal refrigerating machine, with Corliss engine. These same works built last summer at Port Essington, on the Skeena river, British Columbia, refrigerating works for freezing salmon for shipment. The works have been shipping frozen salmon to New York and this week shipped the first carloads of frozen salmon to London, England. They intend also shortly to begin shipments to Spain. Nearly all the canneries will adopt this plan before long.

Col. R. H. Savage, formerly of R. H. Savage, Sons & Co., foundrymen of this city, has accepted an invitation to deliver lectures this winter at Yale University, before the Sheffield Scientific School and also the Vanderbilt Railroad Club of New York.

Irving M. Scott, who is in Washington, is well pleased with the result of the Monterey's trial trip. The Union Iron Works telegraphed the Navy Department that the run was most successful and exceeded the contracts in all particulars. The gratifying reports of the last day's trial incline the officials of the department to believe that it will be accepted as final and that the board will proceed to work up the result immediately. It is believed the builders will earn a large premium.

Secretary Tracy, as had been expected for some time, has awarded the contracts for both the new battleship and the cruiser to the Cramps. He issued a statement in which he explained that he thought both the Union Iron Works and the Cramps were excellent builders, and that nothing would please him better than to divide the contracts, but the law gave him no discretion.

Coast Industrial Notes.

THE salmon cannery at Chilcat, one of the largest canneries in Alaska, has been destroyed by fire.

THE work on the electrical engineering building at Berkely is progressing finely. The walls of the first story are nearly finished.

A COMPANY has been formed for the purpose of raising oysters in the bay at Anaheim Landing. An experiment has been made on a small scale with satisfactory results.

IN the legislature, Bledsoe has offered a bill regulating the hours of labor in sawmills, shinglemills, shakemills and logging-camps, fixing the limit at ten hours a day.

THE big lumber raft sent to this city by the Fort Bragg Lumber Co. was towed down by the steamer Noyo in 36 hours. The raft contained over a million feet of lumber.

REDLANDS during 1892 spent \$145,000 for sewers, sidewalks and drains; \$411,000 for canals, pipelines, reservoirs and streetcars; \$141,000 for business blocks and \$225,000 for residences.

ANOTHER big irrigating reservoir is to be built in Arizona. The new company is called the T. E. Farish Reservoir and Canal Co., and it has been incorporated at Phoenix. Most of the capital has been subscribed by Eastern men.

THE Amador Electric Light and Railroad Company broke ground last Saturday for the new electric road that will ply between Sutter creek and Ione city. Several men are now grading, and rails are arriving on the surveyed route.

The matter has provoked much comment. The pottery trust says the Council's proceeding is illegal, and threatens court proceedings. The aldermen say they passed the resolution because they thought they had a right to protect home industry against any trust.

WORK on a five-mile extension of the California and Nevada narrow-gauge railway will be commenced within a few days at the present terminus at Bryant, which is 22.8 miles from Emerys, Alameda county, where the line begins. The extension will bring the road to the middle of the tract known as the Moraga ranch, and it will run in the direction of Walnut creek.

THE largest logging contract ever let in Washington was signed at Tacoma this week between the Tacoma Mill Co., Allen C. Mason for the Shelton and Southwestern Railroad Co. and Frank Williamson. The latter is to cut and the railroad is to haul 200,000,000 feet of fir timber off the mill company's timber lands in Mason county, Washington. The logs will be sawed here and a large part of the lumber shipped to San Francisco, where the

mill owns a large yard. The steel has been ordered to extend the railroad farther into the timber belt. It will require five years to execute the contract. The freight on the contract will amount to \$250,000.

A PETITION signed by 400 citizens has been presented to the San Francisco Board of Supervisors, asking for the city's proper representation by an exhibit at the World's Fair, by an appropriation of a sum sufficient on the next tax levy for that purpose. There is already a San Francisco World's Fair Commission, but it has been unable to do anything for lack of funds. If the city is to be represented at all, the money should be forthcoming at once.

TRACK-LAYING on the new Potrero electric road has been completed on Kentucky street from the car stables near Second avenue to the Fourth-street drawbridge. Work is now being pushed on the last-named street and is expected to be finished about the end of the present week. It is intended for the present to use horsecars on the Kentucky-street line until the other two branches of the system through the Potrero, Southern Heights and South San Francisco districts are built.

THE San Francisco whaling fleet is getting ready for sea, and next month will see the greater number of the steamers and barks at present in port leave for a cruise in the Japan sea. They will after that rendezvous at Honolulu before proceeding north. The steamer Orca and the bark Wanderer have come off the Union Iron Works dry-dock and gone to Center-street dock to fit out for the cruise. The steamer Beluga has gone to the Union Iron Works dock, and the work of preparation is progressing on every side.

J. W. MORRIS of Oakland has been granted a franchise to build an electric street-railway line by the City Council of Santa Rosa. The proposed line will touch the San Francisco and North Pacific road on the west side of town. From there the new line will run up Fifth street to Mendocino; from there on Fourth to North and Thirteenth streets to McDonald avenue. There is considerable activity in street-railway circles in Santa Rosa. The Central Company is building an important extension, and the Union Company is preparing to build a line to Taylor Springs.

THE combination of pottery manufacturers, in trying to "freeze out" the Stockton Terra Cotta Co., is offering sewer pipe at one-third the price it was a year ago in that city. The local company complained to the City Council that it was in danger of being compelled to shut down if not protected. The City Council has passed the following resolution:

Resolved, That from and after this date no vitrified iron-stone pipe shall be used in the construction of underground sewers in the city of Stockton unless such pipe be of the same kind and quality as that now made and manufactured by the Stockton Terra Cotta Co. of Stockton.

At a meeting of Alaska salmon cannery men it was decided to combine permanently for mutual protection, and this week articles of incorporation will be filed of an association with a capital of \$6,000,000. W. B. Bradbury will probably be the secretary of the combination. The Alaska salmon cannery men did better last season than in many years. The market was overstocked two years ago from the pack of the previous season, and the cannery men decided to combine and limit the pack in 1892 to about 400,000 cases. Old stocks were cleared off in England and canned salmon brought a good price. The pack for this year will be limited to about 650,000 cases.

THE first report of the commissioners having in charge the arrangement of a sewer system for the city has been filed with the supervisors. It recommends the construction of a brick sewer in Scott street, to run northward from Pacific avenue, and from there a pipe sewer to form connections between Broadway and Vallejo street; that a sewer be laid in Filbert street, extending from Scott to Steiner, and that overflows be constructed on Broadway, Vallejo, Green and Union streets. It also recommends that the petition of property owners for the establishment of grades on Merced, between Laidley and Thirtieth streets, and Laidley, between Thirtieth and Merced streets, shall be granted.

A BILL will be presented in the State legislature providing for the purchase of land and the erection of a public building in San Francisco. This building is intended to accommodate the Supreme Court and Court Commissioners, the Hastings Law College, the Railroad Commissioners, Bank Commissioners, Board of Forestry, Bureau of Labor Statistics, Commissioner of Immigration, Insurance Commissioner, State Mineralogist, Yosemite Commission, and the Board of Arbitration. The Governor is to appoint three commissioners to select the site and oversee the erection of the building. Three hundred thousand dollars is to be the limit of the cost of the site, the building, the fee of the attorney and the compensation of the architect and superintendent of construction.

THE Telegraph-avenue electric road in Oakland has now been in operation two weeks and everything has been run in perfect order. The system was a complete success from the start. The Southern Pacific is the only company that has a horsecar line in Oakland. The corporation owns the old line on Twelfth street from Broadway to Thirteenth avenue. The road does not begin to pay expenses at the present time, as the people prefer to ride on the electric cars. The company will make this system into an electric road as soon as they can get an extension of their franchise to Twenty-third avenue. It is probable that the road at the west end will be extended to West Oakland. If they continue down Twelfth street to West Oakland there will be plenty of cars from end to end of the city. There are now lines running on both Fourteenth and Sixteenth streets, one being built on Eighth and one contemplated on Tenth. There are no odd-numbered streets in that district, so that, with the steamroad on Seventh, if all these lines are built, there will be one on every street from Seventh to Sixteenth.

An excursion steamer was launched from White's shipyard at Alameda point on Sunday. The new steamer is

called the Rosalia and will register about 250 tons net. The engines, which are compound, have cylinders of 15 and 34 inches, with a stroke of 24 inches, and will drive the steamer, it is expected, about 16 miles an hour. The dimensions of the vessel are as follows: Length over all, 141 feet; keel, 135 feet; beam, 26 feet; depth of hold, 10 feet. Only the hull is completed. After the launch the new steamer was towed to Folsom pier 2, where the engines and boilers will be immediately put in. The cabins and upper works were ordered from the East and are now on their way here. The steamer is designed for a pleasure boat and will accommodate 400 excursionists. The Rosalia is to be used on daylight routes. The steamer is a novelty of her kind. The facilities for preparing meals and the dining-tables in the main saloon will be extensive. It is expected the steamer will cost between \$75,000 and \$80,000, and will be ready for service by April 1st. The projectors of the enterprise are J. J. Ebert and C. L. Dimon Jr., who came here from Denver, Colo., some time ago.

Reduction in Freight Rates.

The Southern Pacific Company formally announces the following reduction in freight rates to meet clipper-ship competition: Beans, in carloads, from California terminals and points on the Ventura division to all points east of the ninety-seventh meridian on the Atlantic system to and including the New Orleans, but not including the Houston and Texas Central Railroad, \$15 a ton. Beans, from points on the Ventura division to New York only, \$13 a ton; from San Francisco to New York, but not from intermediate points, \$10 a ton in carload lots. Borax, San Francisco to New York only, in boxes, barrels or sacks, \$10 a ton in carload lots; from San Francisco, Oakland, Alameda, Sacramento, Los Angeles, Reno and points intermediate thereto to all points east of the ninety-seventh meridian, \$15 a ton. Wine, in wood, \$10 a ton, that is in carloads, from San Francisco to New York only; from San Francisco, Oakland, San Jose, Stockton, Sacramento, Santa Rosa, Napa, Vina, Marysville, Los Angeles, San Gabriel and intermediate points in California to all points East, to and including New Orleans, \$15 a ton. Brandy from the same points, \$17 a ton. Brandy, in wood, from San Francisco to New York only, \$12 a ton in carload lots. Canned goods, from San Francisco to New York only, \$10 a ton. From San Francisco, Oakland, Sixteenth street, San Jose, Stockton, Sacramento, Santa Rosa, Napa, Red Bluff, Los Angeles, Colton and intermediate points in California to all points East, \$15 a ton. Wool, from San Francisco only to New York and Boston, in grease compressed to nineteen pounds per cubic foot, in any quantity, \$1 per 100 pounds if valued at 10 cents per pound; \$1.25 per hundred pounds if valued over 10 cents and \$1.50 per hundred pounds if valued higher than 14 cents. The rates via the Central Pacific, Union Pacific, Denver and Rio Grande and the Chicago, Rock Island and Pacific from California common points to all points east of the ninety-seventh meridian on the Rock Island, not including points north of Fort Dodge, Ia., or west of Liberty, are as follows: Wine in wood, carloads, \$15 a ton; brandy, \$17; canned goods, \$15 and borax, \$15.

A BRITISH COLUMBIA TUNNEL.—The Nelson Miner says: Mr. Johnson, representing the Schaeffer Gold and Silver Mining Company, of Washington, has completed his arrangements for the purchase of the Mamie, Hamburg and Lady of the Lake claims at Ainsworth. He has also located two claims on the waterfront. It is his intention to run a tunnel in from the level of Kootenay lake to tap the ledges on these claims. During this winter work will be carried on by hand, and a contract has been let to D. W. Clark, Alexander McLeod, Milton Luther and Tom Garvey, all of Ainsworth, to run 300 feet of the tunnel, the work to be completed by the 1st of April, 1893. An air-compressor drill will then be put on and the tunnel pushed to completion. It gives some idea of the magnitude of the enterprise when it is borne in mind that the tunnel will pass under Loon lake at a depth of 1200 feet. Mr. Johnson expects that the company will expend about \$25,000 in tapping the ledges. He is much exercised over the duty on mining machinery. Air-compressor drills are not manufactured in Canada at all, and yet a 30-per-cent duty is exacted on their importation. This tax is calculated to injure mining interests and benefit none. It is the same with the other machinery required. More suitable machinery can be procured in San Francisco than on this side of the line, but the budding industry of mining must be handicapped in order that some manufacturer may have a ready-made monopoly to drop into when the time comes.

THERE is no longer any doubt but that the deposit of zinc in the vicinity of Hillsborough, N. M., is practically worthless. The ore bore such a close resemblance to zinc as to deceive several experts and it was not until the ore had been thoroughly tested that it was found to contain so small a percentage of zinc as to be of no commercial value.

A DISCOVERY has been made at the Unica mine at Angels, Calaveras county, of a pocket so rich that a 28-pound piece of rock yielded 16 pounds of gold; another piece weighing five pounds beld three pounds.

A. EKMAN is busily engaged in preparing and classifying the various ores and minerals he has received from Butte and Lassen counties for exhibition at the World's Fair.

MINING assessments falling delinquent in January amount to \$280,700, of which Nevada mines want \$270,700 and California mines \$10,000.

TWENTY-SIX days' run of the five-stamp mill of the Ashland, Or., Mining Company cleaned up 426 ounces of gold bullion.

Talc and Its Uses.

About 15 years ago a deposit of singularly pure fibrous talc was discovered near Gouverneur, N. Y., and the paper-makers of New England and Pennsylvania began to use it in place of sulphate of lime and clay as an adulterant for paper. The talc, says Stone, was found to have a strengthening effect by binding the fibers of the wood pulp together, and the use has increased until now nearly half of the good printing paper has talc, or something similar, as a filling matter. In the cheaper grades powdered soapstone, an inferior quality of talc, is used, and large quantities of it are annually consumed in the process. The Gouverneur talc is the finest in the world, probably, combining the brilliancy of the North and South Carolina product, with the exceptional fibrous quality of the Virginia variety.

The town of Gouverneur is near the northwest edge of a geological island of granite, gneiss and limestone formations. Toward the west of the town, Potsdam sandstone abounds, and Trenton limestone prevails on the southeast border. The talc deposit is in the townships of Edwards and Fowler, varying in distance from seven to fourteen miles from Gouverneur. Its length is about eight miles and its width one mile. The termination is abrupt at both extremities, and the local experts say that none is ever found except under surface outcroppings. That being true the deposit is limited to the above size, and the sudden and complete change of formation precludes all possibility of finding additional deposits. The veins of talc are nearly always separated by granite and gneiss, varying from thin layers to several inches in thickness.

Since 1879 ten distinct quarries have been opened, some reaching a depth of 400 feet on the slope. The cost of quarrying varies from 60 cents to \$1.25 a ton and the land owners collect from 50 cents to \$1 a ton royalty. The cost of transportation, from the quarries to the mills, over some of the worst roads in the United States, is about \$1.50 a ton, making the total cost of production at the mill \$2.35 to \$3.75 per ton. The average annual production is about 51,000 tons.

The reduction from the roughly-quarried stone to the fine flour used in manufacturing, is not materially unlike flour-milling in principle, though varying greatly in the appliances employed. It is first passed through a coarse, next a fine crusher and lastly through two pairs of buhr stones. It is then loaded into cars and from 800 to 1600 pounds at a time put into an alsing cylinder six feet and one inch in diameter and from six to ten feet long. The cylinder is lined with porcelain brick and for one-third its volume filled with Greenland pebbles. For four hours, or less, maybe, the cylinder is revolved at the rate of 20 revolutions a minute, at the end of which time the talc is in the form of an impalpable white powder, somewhat resembling flour. A part of the talc, known as rensselaerite has hitherto been thrown away, the removal of the glistening particles being a too long and costly process, but the recent introduction of Cyclone pulverizers has made that easy, and the economy in power is very great.

The Aluminium Calendar.

Aluminium is slowly but surely finding its way into commercial and practical value. It has had the usual introduction, both of friends and critics, and has mercifully survived the cruelties of both, the one skinning it alive and the other attempting massacre by kindness. The fault has not been in the metal—that is, as it was made. The division of opinion has been with the users, who are not altogether of that primitive type. The science of metallurgy, though in itself as inexorable as arithmetic or gravitation, is as yet but fractionally understood, while in this, as in all other domains of industrial intelligence, there are always competitive interests to handicap every new discovery or commercial enterprise. In the case of aluminium it has suffered from the two extremes, with the fact remaining like a rock after a deluge that the granite is intact when the mud is out of sight. No fictitious merit can survive practical tests, and no misrepresentation can successfully ostracise any natural product. Aluminium has its place in mineral economy, and its ultimate service will be determined without prejudice, not on what is said of it, but what it is. In its practical uses, experience will be the jury. This is the final adjudicator and practically ignores all premature opinions. We may sin in advertising soap, but we cannot annul the merits of a metal. In this since the merits and demerits of aluminium are not only being canvassed but demonstrated, and while the intelligent uses of the pure metal or its alloys are necessarily progressive, its definite and original qualities are primarily established. In lightness, strength and attractive finish, it is already a factor where such qualities are a special desideratum with its deployment along the same lines increasing and continuous. In certain forms of marine architecture it is making remarkable headway, with an outlook for more extensive service. In household and camp equipage, in surgical apparatus and artificial limbs, and in home and office decorations it has an already established service, and we note among its later uses its use in architecture. A building is reported as having been planned in Chicago, in which there will be no exterior exhibit of wood, stone or brick. The entire exterior, with the exception of the plate-glass windows, is to be of aluminium, sheets of this silver-like metal to cover the walls from the ground floor to a 16-story eminence. This is certainly a new departure; with its success and attractiveness largely provisional, but whether complete or not in its results, it is certainly an indication of what may yet be attempted and perhaps accomplished in the architectural uses of aluminium.—The Age of Steel.

THE steamer Alexander II, Captain Alex McLean, is being fitted out as a sealer, and will be the largest vessel of the kind existing when she is ready for sea. Twelve hunters and as many sealing boats will be taken on the steamer.

British Naval Speed Rules.

A regulation issued recently by the British-Admiralty defines specifically the technical meaning of certain terms employed to indicate the speed to be used by the naval vessels of Great Britain under different conditions of service, and gives rules for determining the power at which the engines are to be worked in conformity to these technical speed terms.

The standard established under this regulation for any vessel is the full power authorized for such vessel during a brief period of the time devoted to her quarterly high-speed trials under service conditions and with natural draft. This standard is taken as unity and the power prescribed to be used at any other time is referred to it.

The classification adopted is as follows:

(a) The authorized power with natural draft is taken as the standard, or the unit. This power is to be used only during four hours of the quarterly passage trials of vessels, or in an emergency, and the air pressures to be used for attainment of this power are not to exceed, in the fire-rooms, one-half inch of water for cylindrical boilers and one inch of water for the locomotive boilers of torpedo gunboats, except when the boilers are fitted with automatic ash-pit doors, in which case these air pressures may be exceeded by one-fourth inch of water if necessary to obtain the authorized power.

(b) "With all dispatch" means the maximum power that can be maintained for 24 hours, and is to be considered as being four-fifths of the standard (a). The four fifths power is only to be employed in cases of great urgency.

(c) "With dispatch" indicates the maximum sea-going speed—that is, the highest speed which can be kept up constantly for days or as long as the coal lasts. The power prescribed for this speed is three fifths of the standard. When steaming "with dispatch" all the boilers are supposed to be in use, with the engine-room force doing duty in three watches, assistance being given from deck if necessary, owing to the coal being so stowed as not to be readily accessible.

(d) "With moderate dispatch" is to be understood as meaning that two-fifths of the standard power (a) is to be used.

(e) "Ordinary speed" is the term employed when one-fifth the standard power is to be used, and covers the conditions under which passages are to be made ordinarily.

(f) "Most economical speed" denotes the speed at which the greatest distance can be covered with a given amount of coal. This can only be determined by trial for each ship under varying conditions of wind and weather. This speed is to be adopted whenever the economical use of fuel is imperative and also in those cases where the "ordinary speed" is less than the "most economical speed."

The quarterly passage trial, to which reference has been made, is a trial executed once a quarter, except in the case of vessels engaged on surveying service. The object is to make sure that the machinery is kept in efficient order and to provide for the training of the engine-room force in working the engines at high speed. The trial consists of a passage of not less than 24 hours' duration, made "with dispatch." During each one of these trials the engines are run for a period of four hours at their highest speed with natural draft, care being taken not to exceed the authorized natural-draft power.

The use of the steam blast during the quarterly passage trials is prohibited and vessels fitted for using it are only allowed to resort to this means of increasing their speed in cases of great urgency and for short periods only.

Phosphate Rock.

Since the first use of the phosphate rock discovered in South Carolina it has furnished a large proportion of the phosphoric acid used in the manufacture of commercial fertilizers. It is found in masses varying from small sizes to fragments weighing 100 pounds or more and covers a considerable area near Charleston, in that State. More recently large deposits of this rock have been discovered in Florida, thus assuring an apparently abundant supply of one of the chief constituents of plant food at a cheap cost. The Carolina rock contains from 25 to 32 per cent of phosphoric acid, while the Florida deposits, so far as yet known, are more varying in their composition. To make the phosphoric acid in bones and phosphate rocks more directly available for plant use they are ground and treated with sulphuric acid, which combines with the lime and liberates the phosphoric acid, thus producing what are known as superphosphates.

CALIFORNIA PETROLEUM.—The business of prospecting for, raising and utilizing petroleum in California has during the year under consideration been prosecuted actively, and with a good measure of success, the total output of the crude material being estimated at about 500,000 barrels, say 20,000,000 gallons, a quantity unprecedented in the history of the industry in this State, where alone on the Pacific coast it has yet obtained a foothold. How rapid has been the recent growth of this industry in California is shown by the fact that the output of oil in 1891 amounted to only 350,000 barrels, the largest that had been made up till that time. The principal producing localities have been the several districts in Ventura and Santa Barbara counties, credited with 265,000 barrels; the Pacific Oil Company, operating near Newhall, Los Angeles county, 150,000 barrels; the Puente district, same county, 35,000; all other localities, 50,000. According to this showing, California ranks third in the oil-producing States, being excelled by only Pennsylvania and Ohio. At the same time the California crude oil sells for more than twice as much as it does in either of these States, there being here a great demand for it for fuel purposes.

What We May Produce.

Though we are shipping to distant parts both by ship and rail immense weights of produce and receiving therefor considerable sums of money, there are still deficiency items in local production of articles for home consumption. Of course these items are almost insignificant in comparison with the imports of food supplies which California needed in earlier years, and yet the saving of their cost, or rather the distribution of it among our own people would help out a good many individual incomes. Governor Markham wisely makes an allusion to this subject in his biennial message which went to the legislature on Tuesday of this week, and the statistics he gives are of interest. The quantities given are in tons weight of the articles mentioned, and they are presented merely as estimates, not accurate statistics, of imports into the State:

Live stock.....	40,000	Potatoes.....	3,000
Wool.....	1,500	Broomcorn.....	800
Hides.....	600	Flour.....	2,500
Cured meats.....	20,000	Other mill products.....	2,600
Poultry.....	1,000	Starch.....	1,600
Butter.....	2,000	Olive oil.....	150
Cheese.....	1,800	Honey.....	60
Eggs.....	3,500	Canned goods.....	6,000
Hay.....	15,000		

These quantities can be reduced or expanded in several ways to bring them within the adequate conception of the reader. Perhaps dividing by ten to bring the material into carloads will serve most minds best. We have then 4000 carloads of live stock brought into the State, and this would be about equal weight to the whole orange crop of California for last year. The weight of imported cured meats was about half as great, representing, however, a vastly greater live weight of animals. Continue the calculation as we may it will be all the plainer that we are still dependent upon adjacent or distant States for a respectable part of our food supplies which we could as well produce for ourselves. Think of a State in which well-kept poultry is as profitable as it is here purchasing from the outside 100 carloads of fowls and 350 carloads of stale eggs. Other things in the test are almost as interesting in their way.

We are not unmindful of the fact, of course, that much of this imported food comes from regions of cheaper lands than ours, and part, no doubt, from free ranges. Still there is good opportunity to overcome even such odds by a little closer study of the arts and economies of production. It is quite possible to make a respectable figure in turning wastes and by-products into desirable and marketable material, just as the most successful manufacturers do by close figuring and constant personal attention to details.

Such calculation is not consonant with California traditions, and yet if California continues as she has advanced during the last decade, she will become quite a thrifty State in the end. Of course, as long as boom products command boom prices there will not be serious thought of the small arts of production, but the tendency is the other way, and our people will ultimately learn how to squeeze a nickel so that it will fly into five pieces. We are not anxious for such a day, and yet when it comes we shall be found with greater accumulations and with a spirit of independence and widespread condition of forehandedness which will give us greater industrial strength.

Dredging the Salmon River.

However impracticable it may appear at first to the unthinking mind—this talk of dredging Salmon river for its concentrated treasure in the form of placer gold—yet a thinking man who has kept at all posted with regard to the recent steps taken in scientific knowledge, brought to successful issues through earnest investigations and experiments, cannot but acknowledge that by the use of the lately invented suction dredge, such a scheme would not only be feasible, but would bear the stamp of success on it from the start.

If once bedrock can be found, the nozzle of the dredger that will admit of the suction and passage of everything brought under its influence to the consistency of a pebble three inches in diameter, will ride over its surface in a semicircle, taking in, of course, a fresh swath, as it were, at each new anchorage.

All the larger boulders, of course, are cast aside, the nozzle being made in the form of a flange, convex, with corrugations that agitate the surface on which it is resting in accordance with the number of revolutions it makes per minute; powerful suction pumps attract the material to the deck of the dredge, where it is treated as suitable to its condition.

The principal rivers of New Zealand are being successfully treated in this manner at the present day. Enterprise is all that is needed to bring this industry to the front, and when once attempted, should the experiment prove that Salmon river bed contains enough of the precious metal to make it a success, he alone who first placed it there can be the judge as to how much our community will be benefited by it.—Salmon City Hydraulic Miner.

DEATH VALLEY'S BORAX TEAM.—One of the odd contributions to the World's Fair Mining Department will be what is called the Death valley borax team. It is contributed by the Pacific Coast Borax Company, and consists of a model in borax four feet high, a borax wagon loaded, and on its way over the desert from the famous Borax lake, California. The wagon, to which is attached a provision cart and water-tank, has hitched to it 20 mules. In crossing the dry plains about the borax deposits, it is necessary to carry sufficient water for both the men and the stock.

WM. J. COX who was for a long time superintendent of the famous Mollie Gibson mine, under manager C. E. Palmer, is now manager of that property. This Colorado mine paid twelve dividends in 1892 aggregating \$1,800,000, and has started the new year with the regular dividend of \$150,000.

Importance of the Mining Industry.

According to reports of the Bureau of Labor Statistics for Colorado, the number of laboring miners in the precious metal mines is 16,962. In the coal mines there are 6000, making the total 22,962. The number of teamsters, woodcutters, carpenters, blacksmiths, employes in mills and smelters, charcoal burners and laborers who are directly employed in supplying mines or hauling ore, amounts to 20,000. So that out of a total voting population of 92,000 over 50 per cent are engaged in work furnished solely by the mines. In addition to these are thousands of railway employes engaged in a traffic dependent solely upon the mines. There are other thousands engaged in manufacturing mining machinery, and other thousands engaged in manufacturing goods consumed by those who are supported by mining, and other hundreds engaged in merchandising which is supported by these mining people. And there are several thousand farmers who can farm at a profit only because the miners furnish them a market.

To understand the importance of this industry to the State, let it be supposed that every mine were to close down. The immediate result would be to throw 42,000 men out of employment, and their means of livelihood would be at an end. The manufacturers of mining machinery would have no market for their wares and they would close. The mills and smelters would be idle. The workmen would have no means to pay the grocer and butcher, the railways would have no freight traffic, the men who live upon their receipts from ore sold would be like the wage-workers, and how would all this affect business? What would real estate and railway property be worth? Who would buy the products of our cotton and paper mills and other factories? The inevitable result would be ruin, and the coyotes and jack rabbits would play hide and seek in Colorado towns and cities.

Of course such an event as the closing down of all the mines is not possible. But of the 895 producing gold and silver mines in the State, it is not impossible that a large proportion may close down. At least, over 700 of them yield silver as their chief product. Over 400 yield silver and lead. Whatever affects the price of either silver or lead affects these mines, and it is not impossible, or even improbable, that a decline in the price of either metal will close down many of these properties. Instead of throwing 42,000 men out of employment, a quarter or a third or half of that number may be deprived of work. While such an event would not bring ruin to the State, it would bring it to many thousand men, and would be a serious injury to all lines of trade.

We have used these figures simply to illustrate the importance of the mining industry to all the West; to call attention to the fact that it is the foundation stone upon which the whole business superstructure rests. It is a pretty good truth in engineering as well as all other things that the foundation must be sound, else the superstructure is likely to fall. It is to the interest of every man to aid in making the foundation sound.—Denver Mining Industry.

One Location to One Discovery.

Secretary Noble last week made an interesting decision, in which he canceled the patent of J. F. Bigelow for the Poplar Creek Consolidated quartz mine in Marysville district, and comprising the Pinenut and Gorilla locations, both made on the same day in 1888 and afterward purchased by Bigelow. The original discoverers and locators were D. M. Bell and Joseph Braden, who, in their location notices, failed to recite that they had discovered a vein or lode. They took up two full claims and started work on the division line of the two claims.

Secretary Noble says that good faith is required of those who locate lands for mineral and make entry thereof, and no valid location can be made unless there has first been an actual discovery. The law contemplates that the discoverer shall have the right to locate his claim to the exclusion of all others, and if the discovery is made by three parties, but one location can be made by them, as the first is the only single discovery.

"No man being rational," says the Secretary, "would discover a vein or lode and so describe the location as to make one of the end lines run through the center of the discovery shaft, thus leaving territory not located in which it was demonstrated that ore existed, and which might have been included in the description. In this case it is decided that it was one discovery made by two men and only entitled them to make one location."

"If the law could be so construed as to allow two locations in a case like this," concludes Mr. Noble, "it would also have to be held that one discovery would entitle the discoverers to make four locations, placing a one-fourth discovery to the credit of each, and the law is not susceptible of any such construction. A discovery is a whole, and may not be divided and parceled out among several discoverers."

MRS. PHOEBE A. HEARST has returned from her European trip. While she was in Europe Mrs. Hearst occupied herself in gathering information as to industrial homes for boys, with a view to the establishment of one for the destitute boys of California. Mrs. Hearst intends to establish such a home as a memorial to the late Senator Hearst. It will be erected on the 450 acres near Pleasanton, which the Senator once intended for a horse farm. The building will cost about \$200,000, and will be supplied with everything necessary to the industrial education of a number of boys from 8 to 16 years of age. The home will probably be self-supporting; but, should it fail to be, Mrs. Hearst will furnish the necessary financial assistance. It will be managed by a board of directors, but will be under Mrs. Hearst's personal supervision during her lifetime. A monument to Senator Hearst will be erected on the ground.

U. S. Branch Mint Report.

The coinage of the United States Branch Mint in this city during each month of the year ending November 30, 1892 was as follows:

Month.	Gold.	Silver.	Total.
December 1891.....	\$4,122,500	\$100,000	\$4,222,500
January, 1892.....	1,440,000	240,000	1,680,000
February.....	2,220,000	240,019	2,460,019
March.....	2,660,000	236,170	2,896,170
April.....	1,822,500	100,000	1,922,500
May.....	979,500	100,000	1,079,500
June.....	1,755,500	197,794	1,953,294
July.....	1,140,000	147,000	1,287,000
August.....	2,140,000	148,620	2,288,620
September.....	2,160,000	100,000	2,260,000
October.....	1,812,500	100,000	1,912,500
November.....	1,260,000	180,000	1,440,000

Totals..... \$23,512,500 \$1,895,703 \$25,408,203

Classified, the coinage of the past twelve months compares with the corresponding months of the previous year as follows:

Double Eagles.....	\$21,830,000	\$20,865,500
Eagles.....		1,155,000
Half-Eagles.....		1,492,000
Standard Dollars.....	5,190,000	1,206,000
Half-Dollars.....		444,514
Quarter-Dollars.....	554,000	159,020
Dimes.....	319,011	86,169

Total..... \$27,893,011 \$25,408,203

The branch Mint was established in this city in 1854 and its total coinage to November 30, 1892, was as follows:

Double Eagles.....	\$714,257,520
Eagles.....	55,237,560
Half-Eagles.....	59,026,040
Three Dollars.....	186,300
Quarter-Eagles.....	1,861,255
Dollars (Gold).....	90,232
Standard Dollars.....	79,275,073
Trade Dollars.....	26,647,000
Half-Dollars.....	14,533,739
Quarter-Dollars.....	6,121,845
Double Dimes.....	231,000
Dimes.....	3,875,894
Half-Dimes.....	119,100

Total..... \$961,462,558

Of the above amount \$830,658,907 was in gold and \$130,803,651 was in silver coin

Thirty-Eight Irrigation Districts.

L. M. Holt, editor of the *Rialto Orange Belt*, has just made an interesting compilation relative to the irrigation districts of the State.

It is found that 38 districts are now in working order throughout the State. There have been a number of others organized, but varied obstacles have interfered with their continued activity.

Three of the districts are in Colusa county, two in Stanislaus, two wholly in Fresno, three in Fresno and Tulare, three wholly in Tulare, one jointly in Kern and Tulare, five in Los Angeles, eight in San Diego, seven in San Bernardino and one each in Orange, Kern, Glenn and Yuba counties.

The 38 districts contain 2,149,724 acres; 19 districts report having voted bonds to the extent of \$11,834,000.

There are also 13 other districts that have voted \$4,942,000, and these districts have sold no bonds.

This makes a total of \$16,776,000 in bonds voted by 32 districts. There are six districts in the list that have not as yet voted any bonds.

The sale of bonds for cash amounts to \$2,622,000, and traded for water rights \$2,995,200, a total of \$5,617,200 in bonds disposed of out of \$11,834,000. The other districts are evidently not ready to sell their bonds as yet.

The assessed valuation of 28 districts is \$32,992,849. These 28 districts contain 1,515,594 acres and the assessed valuation is a little over \$21 per acre.

The 32 districts that have voted bonds contain 2,831,424 acres, and the bonded debt is an average of \$52 to the acre.

Of the 38 districts, the issue of bonds has been confirmed in the courts in 26 districts.

In 26 districts the report comes that the Wright Irrigation law is satisfactory to the people. Of course this means in a general way, subject to such amendments as may be deemed necessary. In one district the report is that it is unsatisfactory, in one district the report is doubtful, and the other districts are not heard from.

Black Hills Mines.

The mineral output from the various mines of the Black Hills for the year 1892, as far as can be ascertained, has been as follows:

Homestake.....	\$3,000,000
Golden Reward.....	445,000
D. & D. Smelter.....	700,000
Consolidated Plant.....	500,000
Welcome Plant.....	48,000
J. R. Mine.....	75,000
Big Missouri.....	35,000
Columbus Mining Co.....	63,000

In addition to this, many of the mines have shipped their ore to eastern smelters, and no definite statistics can be gained of its value. A conservative estimate would be \$1,500,000.

The following dividends have been paid by the mining companies of the Black Hills for the year 1892:

Homestake.....	\$150,000
Deadwood-Terra.....	100,000
Golden Reward.....	60,000
Monitor.....	22,000
Buxton.....	20,000

The Bacteriology of Poison Oak.

CLAREMONT, Los Angeles Co.

TO THE EDITOR:—What poison ivy is to the eastern States, poison oak is to the Pacific coast. By many the two plants are pronounced identical, the name *Rhus toxicodendron* being assigned to both.

The California variety attains a growth from two feet upward, not, however, to exceed a good-sized bush. It has a compound leaf of three leaflets, which are of a bright green color throughout the summer, but which change to beautiful red in the autumn. The bright colors allure the unsuspecting on till a bunch of the leaves is picked for the purpose of adorning some table or mantel-piece at home.

The poison-oak plant prefers as its habitat mountainous districts, especially canyons or the edges of creeks, but by no means is it found exclusively in those places. About each plant there seems to be a floating infection, a poisonous atmosphere, which, strange to say, has a variety of effects upon different individuals, the extremes being a painful inflammation, on the one hand, and but little or no effect upon the other; while between, lie all the possible gradations. The first sensation noticed, on being poisoned, is that of itching, which is usually accompanied by redness of the skin on the affected parts. The itching increases till it becomes almost intolerable, the skin smarts or burns, and swelling ensues.

Shortly, little protuberances appear, which increase in size till they break, yielding a transparent, sticky fluid called serum. The vesicles (as these protuberances are called) become covered with a crust and so endeavor to heal. The final stage, accompanying convalescence, is characterized by the peeling off of the cuticle on the affected parts, exposing to view the new, fresh skin underneath.

What is the nature of the poison that produces the unpleasant effects mentioned above? Is it vegetable, mineral or bacteriological—that is, produced by the ravages in the system, of microbes of disease? Such questions have confronted the investigator from time to time; and up to date, about the only results arrived at are expressed in some newspaper by a half-dozen words stating that poison of poison oak is due to germs. Doubtless, this is the truth of the matter, and it is the object of this article to present to the reader some of the evidences which sustain this truth.

The poison-oak plant is the favorite abiding-place or habitat of a microscopic germ which for the present we will call the poison-oak germ. There is nothing unusual in this, for we find similar phenomena on every hand. The white scale prefers citrus trees to feed upon; the potato bug takes to potato plants; certain plant lice prefer rose bushes; others would rather feed upon a different kind of bush; and so it goes, there seeming to be a special parasite for each plant. In the microscopic world we find the terrible bacillus tuberculosis feeding upon the lungs of unfortunate consumptives.

But we can reason in other ways better than by analogy, for if we take a poison-oak leaf and wash it in distilled water, we will find floating in the water little spherical jelly-like bodies. Bacteriologists term such sphere-like germs *micrococci* to distinguish them from cylindrical forms (bacteria) and rod-shaped forms (bacilli).

We must notice what we can about these micrococci, for we shall have occasion to refer to them again. If they are real, live germs, they should grow and multiply in any fluid upon which they can feed. Beef broth, which is usually used for cultivating and growing microbes of all kinds, has been tried, but so far has not succeeded. As they do live and thrive upon the juices of the poison oak, let us make a decoction of the roots and thus get fresh, wholesome material in which to breed them.

This decoction is completely sterilized by repeated boiling, after which it is placed in test tubes to the depth of one-half an inch in each test tube. These are set in a warm place for a few days, and if any cloudiness appears in the clear liquid at the bottom of any tube, it is to be discarded, as some unknown germ has succeeded in getting into it, and is beginning to multiply.

A tube with clear liquid inside may be used with safety as a culture medium for our poison oak micrococci. To avoid cultivating other germs which may be adhering to the outside of the leaves or bark, we shall dampen the point of a sterilized needle with the sap from a freshly made incision underneath the bark. The needle is at once transferred to the test tube, the cotton stopper replaced and the whole set in a warm place to await developments.

In a few days cloudiness is noticed, provided our inoculation was successful, and a drop of the liquid may now be examined with a microscope. If but one kind of germ is found, we may indeed be thankful, for we have a *pure* culture.

Let us examine the myriads of forms before our eyes carefully. We see sphere-like forms in every way identical with those found in the washings from the leaf. They are the progeny of a few forms we introduced when we dropped in the needle.

Now let us turn our attention to something a little different. We will make use of two persons who are susceptible to poisoning from the poison oak; that is, who "take it" easily. On the wrist of one, we will place a poison oak leaf for a second and then immediately bind on a cloth, the leaf being of course removed. The cloth prevents any rubbing or spreading by rubbing of any infection left by the leaf. The symptoms of poisoning at once set in—the itching, the smarting and the swelling—but it is noticed that the disease, if it may be called such, confines itself to the one locality; viz., where the leaf touched the skin. If cloth around the wrist has in any way slipped, say from right to left, the disease has spread in that direction, and to the same extent that the cloth has been displaced.

The second individual allows a leaf to be in contact with his hand for the same time as before, but instead of binding the place with cloth, he rubs his other hand over the

place, then rubs his face and both hands thoroughly. Shortly, itching, smarting, swelling, etc., have set in wherever he has rubbed. The palms of the hands seem to be unaffected, however, but where the skin is thinnest, there the effects are most noticeable.

Let us now draw some conclusions from our experiments upon the persons. That the poisonous effects are largely local is certain; so that, if persons who had touched the plant would refrain from rubbing their eyes and face and hands, many severe cases of poisoning would be prevented, as the affection, which is at first local, would not be spread to other parts, and hence increase the area of inflammation.

The micrococci, on being transferred to the skin, immediately penetrate the tissue beneath (unless the cuticle is too horny or thick, as in the palms of the hands), when wholesale destruction commences.

Why is it that some people will be affected by the poison oak plant to little or no extent, while others suffer so much? This is hard to answer with certainty. It is quite probable that the state of the system as regards degree of acidity has something to do with it. Some germs thrive best in acid media of certain strength, while others require less acid or even no acid, and some thrive best in alkaline solutions. The blood differs in different individuals, in one case being in the right condition to promote the most rapid multiplication of the germ, while in another case hindering the growth and development of the germ to a considerable extent. In many cases, if not all, the disease microbe itself makes a condition that causes its own destruction. This is by a secretion, or else by the resultant action of the secretion upon the tissues.

Often these products (called ptomaines) are exceedingly poisonous, but whether harmless or harmful to the human species, they become fatal to the microbes that make them when a certain strength is reached. For instance, vinegar or dilute acetic acid is a ptomaine, and when about 17 per cent is present where the germ is at work, the process ends, for at this point the germ is killed.

But nature does not wait for the self-destruction stage to come, for in some cases this would not be reached till after the death of the individual person. She has a standing army of little cells, which is found in all parts of the body. These cells are endowed with the power of locomotion and also with the power of digesting any foreign particle that comes in their way. They are especially on the watch for disease germs, as if they knew that these latter constituted the deadliest foes of their lord and master—the individual himself. When acting as defenders of the body the cells are termed *phagocytes*.

Now, when disease germs enter the living tissues at any place, the phagocytes in the vicinity of that place congregate and proceed at once to annihilate the intruders. The great number of the phagocytes produces a swelling and we say inflammation has set in.

The micrococci of poison oak on being transferred to the surface of the skin commence their ravages, and, if the conditions are right, will soon be in the delicate tissue beneath. Here the phagocytes are encountered and great quantities of them pour in from all sides. A miniature battle ensues, the germs multiplying as fast as they can and tearing down the tissues, and the phagocytes eating them up with all possible haste. If the microbes win, the person dies; if the phagocytes win, he lives. The phagocytes conquer in poisoning from poison oak, but thousands of them are killed. The sticky serum from the vesicles formed during the course of the disease contains phagocytes, and we should be able to see the micrococci which they have eaten inside of them. Upon examining some phagocytes found in the serum we will notice the micrococci present, and they are like those we saw as coming from the surface of the poison oak leaf.

What a touching sight it would be if we could but see our faithful little phagocyte servants fighting for us to their own destruction! They are not *things*, for they eat, move, digest, generate cells like themselves, and, when the time comes, die, and are carried off by the blood.

Now let us make one more examination. Take a small fragment of the skin which peels off during convalescence. Place it in a drop of distilled water and put it under the microscope. The skin that has peeled has been the seat of action for the spread of the micrococci for a week or so, and therefore should be pretty well impregnated with them. Surely enough, myriads upon myriads of forms that are no different from those we have examined before, now appear before the eye. If such fragment of skin should contain so many, what countless millions would be found in the flesh of one's hand or face.

We see, then, that we may become the feeding-ground, so to speak, of the micrococci and furnish to them at our own expense, material with which they can propagate themselves.

But are the poisonous effects due to the micrococci directly, or are they due to the ptomaines they make? This is a question. The floating infection which exists in the neighborhood of poison oak plants or bushes may be the volatile ptomaine, but even then some of the germs must be present, or so many would not be found on the skin during the disease.

However, it is evident that the micrococci are either directly or indirectly the cause of the poisonous effects.

In the autumn, when the sap goes to the roots and the leaves turn red from oxidation, the germs seem to lose a large part, if not all, of their injurious properties. This of course is probably due to the lack of sap upon which to feed and a consequent change of state in themselves.

Remedies too numerous to mention are used by the people of the Pacific coast to diminish the inflammation in a case of poisoning. The ideal remedy would be that which would destroy the micrococci upon simple contact with them, and at the same time be perfectly harmless to the flesh. Most of the substances now used are used for the purpose of decreasing the inflammation, and one of the best of these seems to be the sugar of lead in solution, bathed upon the affected parts, but handled carefully, as it is an active poison. While every one east of the Rockies is awaiting the remedy which will stop the ravages of the

cholera, the yellow fever, or the smallpox microbe, let us be on the lookout for something which will destroy the less fatal but troublesome micrococcus of the poison oak.

F. H. BILLINGS.

Quicksilver.

An Increased Production During the Last Twelve Months.

During the 12 months ending November 30, 1892, the receipts of quicksilver at this port aggregated 20,969 flasks valued at \$891,182. The receipts during each month during the past two years were as follows:

Months.	1892. Flasks.	1891. Flasks.
December	1,287	1,304
January	1,701	1,663
February	1,543	1,011
March	1,875	866
April	1,901	1,072
May	1,598	1,047
June	1,614	1,031
July	1,632	1,166
August	2,013	1,099
September	1,753	944
October	2,171	1,751
November	1,881	1,522
Totals	20,969	14,506

The exports by sea during the 12 months were not large as compared with the receipts, but the aggregate is nearly twice as large as the total for the preceding 12 months, as shown by the following figures for each month:

Month.	Flasks.	Value.
December, 1891	138	\$ 5,865
January, 1892	637	24,574
February	2,145	90,182
March	594	23,533
April	385	15,817
May	541	22,915
June	471	20,504
July	773	32,847
August	146	5,704
September	462	19,233
October	594	24,948
November	310	12,690
Totals	7,196	\$298,812

The exports of the year were distributed as follows:

	Flasks.	Value.
New York	3,318	\$142,365
Mexico	2,689	108,267
Australia	778	31,634
British Columbia	42	8,535
Central America	215	1,669
New Zealand	160	6,467
Totals	7,196	\$298,812

The export trade of the year by sea compares with the two preceding years as follows:

	Flasks.	Value.
1891	3,869	\$167,694
1890	3,516	176,268

The product of the past year and of all the California mines from 1877 to 1892, both years inclusive, comprising a period of 16 years, is as follows:

	Flasks.	Flasks.
1877	79,395	1886
1878	63,880	1887
1879	73,684	1888
1880	59,926	1889
1881	60,851	1890
1882	52,732	1891
1883	46,725	1892
1884	31,913	
1885	32,073	Total
		697,724

The production of all the mines during each month of the past year and for the 12 months preceding is as follows:

December, 1891.....	Flasks.....	July.....	Flasks.....
January, 1892.....	1,704.....	August.....	2,169.....
February.....	2,474.....	September.....	2,251.....
March.....	2,303.....	October.....	1,991.....
April.....	2,373.....	November.....	2,707.....
May.....	2,271.....		2,718.....
June.....	2,141.....		
	2,079.....	Total.....	27,259.....

The product of each mine from January 1st to December 1, 1892, and for the whole term of 16 years, from 1877 inclusive, is as follows:

	1892. Flasks.	1877-92. Flasks.
New Almaden	5,210	302,867
Attna	1,150	46,270
Napa Consolidated	5,340	28,609
Great Western	5,522	59,142
Sulphur Bank	1,280	73,426
New Idria	758	35,392
Great Eastern	1,515	18,465
Redington	628	33,876
Bradford		10,397
Guadalupe		45,189
Lake	526	526
Mirabel	2,790	2,790
Abbott	636	636
Various	200	38,487
Totals	25,555	696,020

The total dividends declared by quicksilver mining companies during the past year amounted to \$162,500 of which the Great Western Company disbursed \$112,500.

The Season of Mining Booms.

Now is the season to start mining booms, says the *Pioche Record*. With snow on the ground from two to ten feet where the mineral has been reported found, the dead beat who "discovered" the wonderful place is pretty sure of his lies not being found out until springtime. In the meantime he is living on the fat of the land at the expense of gudgeons whom he is to "let in" on the wonderful discovery. But when the snow vanishes in the springtime, so does the "prospector," to repeat the story in another part of the country next season.

Mechanical Progress.

The Electric Motor and Machine Design.

Two or three years since, says the *Iron Age*, it would have required a careful search to find an electrically-driven traveling crane, and yet now they are a part of the equipment of almost all of the new shops and also of remodeled old ones. This industry has become so important as to cause the establishing of concerns for the special manufacture of electric cranes, and has compelled makers of other styles of cranes to add this branch to their business.

We find that the electric motor, as applied to the driving of machine tools, is now in its evolutionary stage. It is forcing its way into the machine-shops, but with only two or three exceptions it appears merely as a special appliance intended for some particular operation. In the De La Vergne erecting-shops, recently described in the *Iron Age*, electric motors furnish all the power needed, and the same is true of the extensive establishment of Fraser & Chalmers of Chicago, who now have an aggregate of some 350 horsepower in electric motors distributed through the works.

The electric motor has proved to be as reliable as, and more economical than, the lineshaft. The electricity is conducted from the dynamo to the motor without an appreciable loss, and when the motor stops, there is no loss because of useless motion. Having these decided and accepted advantages, we must look to other causes for its comparatively insignificant employment. Of these we shall consider but one, which is, we think, the chief—the high speed of the motor itself. To apply the motor to the running of large tools such as lathes, planers, boring-mills and the like, where the cutting speed is very low, one of two things is necessary—either we must employ countershafting between the motor and machine to reduce the speed, or the driving gear of the machine itself must be so proportioned as to provide this reduction. The former is by no means an ideal arrangement, yet it is the only one now in vogue. The motor should be carried by the machine to which it supplies power, and all outside belts and gears should be discarded. To reach this perfected condition, we must either reduce the speed of the motor without increasing its size or lessening its power, or the machine must be so geared as to permit the use of the motor even at its present high speed. So far as the first requirements are concerned, electricians the country over are now studying the problem, and to say that they will not ultimately succeed would be presumptuous. The second question depends solely, we think, on the future demand created by the electric motor. If there should arise a market for a machine geared and adapted to be run by an electric motor, making say 1000 revolutions per minute, then the tool-builders would meet the demand quickly, and would introduce the necessary gearing. We do not think it probable that machine tool-builders will change their design to accommodate the motor simply for the sake of introducing a tool carrying in its own frame the device needed for driving it. In other words, tool-builders will not push the introduction of the motor, for the simple reason that they have nothing to gain by so doing. Their machines require just so much power to run them, and the source of that power, whether line-shafting or electricity, is in itself of no interest to them.

The user of the tools, because of the saving to be derived, will advocate the motor, and if this demand ever becomes of sufficiently widespread importance to justify it, then the builder will modify his tool to meet the requirements of the motor. He will do this by placing the motor on the tool, thereby doing away with the inconvenient, unsightly and power-consuming countershaft.

In order to accomplish this, it would be necessary in all cases to redesign driving gear, and in some instances to remodel the entire tool. At the present time we doubt if a line of electrically-driven machine tools would "take." The average mechanic has no leaning toward an excessively high speed power; he has become accustomed by long usage to a speed of from 100 to 120 revolutions. He will not take kindly to a tenfold increase. For this reason alone he would regard with suspicion a tool driven direct by a motor. It will therefore depend upon the user, whose pocket is most directly affected, to first employ the motor. The question is an exceedingly interesting one, and one that will compel close study and attention in the near future.

Progress in Steam Engineering.

In the year 1892, man has not made any special mark on the calendar of engineering progress. It has, however, says the *Age of Steel*, noted some extensive applications of what has been already reached by the engineer. The development along established lines has been large, and the utilization of what is already definitely usable has been kept to date in a loyal and practical fashion. The triple and the quadruple engines have made their way into large plants, where, as a rule, the bicomponent is, or has been, a favorite. In the rate of speed some of our railways have lowered their record, the New York Central running the Empire State Express on a regular schedule of 440 miles from New York to Buffalo in 504 minutes, while a compound high-speed passenger locomotive on the Central Railroad of New Jersey has broken all previous records by running a mile in 39¼ seconds.

The same advance has been made in speed in marine engineering, the transatlantic record being lowered to 5 days, 14 hours and 14 minutes by the Inman steamship, City of Paris. In river and coast shipping, the old-time paddle-wheel steamer is being replaced by the propeller, an innovation that is finding its way in the ferry traffic of New York and Boston. With better steam facilities in reach, the ship architect has constructed a Cunarder that from stem to stern will measure 700 feet, with others designed to outmeasure the latest giantess of the ocean by 100 feet. In the handling of engines and boilers there has been an increase in efficiency and a decrease in the usual tally of disasters and explosions. In some prominent electric works the countershaft is disappearing, and engines are being belted to the dynamos direct, or transmitting the moving parts of electrical machinery upon their main shafts.

In cable and electric street railways, improvements in methods are continuous, and in such huge undertakings as the World's Fair and the utilization of waterpower evolved in the tunnel at Niagara Falls, the science of steam engineering has added new triumphs to its practical record. With other enterprises now in contemplation, the future has its broad promise of greater things; and taken all in all, both in the manipulation of motive-power and the efficiency of its mechanical aids, the table of progress, if lacking in epoch-making changes, is by no means behind the duties and opportunities of 1892.

Test of the Wire Gun.

At the third shot fired from the Brown segmental tube wire-wound gun at Birdsboro, Pa., the enormous pressure of 60,000 pounds to the square inch in the powder chamber was registered by the United States Army pressure gauges used. This gun was fired for the first time, Dec. 3, at Birdsboro, Pa., where it was built. Although it is only a 5-inch rifle the projectile used at each of the three shots weighed 84 pounds. The standard navy 5-inch shell weighs only 60 pounds.

The gun was mounted on an old carriage, placed on a railroad flatcar and was fired into a stone quarry on a down grade. For the first shot a charge of ten pounds of sphere-hexagonal powder was used as a warming charge and no chamber pressure was taken.

For the second shot a powder charge of 15 pounds and an 84-pound shot were used. The chamber pressure was found to be 28,265 pounds per square inch.

On inserting the third 84-pound shot it was found to be rather a close fit. The shot was of cast iron, not finished with the nicety usual in service shells, and the gun itself was only rough bored. It had no lining tube whatever, either in chamber or in chase. It is probable that this shot, by reason of lack of finish, was a mere trifle too large for the bore and that thereby the friction was made so great as to cause exceptional pressure in the gas confined behind it. The powder charge was 18 pounds, and this ought to have given a chamber pressure of about 35,000 pounds per square inch. The recoil was excessive, the car running up the incline an unusual distance. The breech mechanism worked perfectly and there was no alteration whatever in the bore, but when the pressure gauges were examined they were found to register 60,000 pounds pressure per square inch.

As such a result would have burst any other kind of gun, Lieutenant G. N. Whistler, the ordnance expert in charge of the gun, was unwilling to make public the pressure obtained until he should make a further test. Having now done so and proven conclusively that the pressure of 60,000 pounds

was reached, Lieutenant Whistler has made a report to that effect.

The test means that a gun superior to any other gun heretofore known has passed through a crucial and unexpected trial with complete success. The standard guns of the army and navy are not fired with a maximum pressure of more than 38,000 pounds, and are not built to withstand more than 43,000 pounds per square inch.—American Manufacturer.

Scientific Progress.

The Reflector with the Projection Microscope.

The following interesting communication has been addressed by Mr. G. B. Buckton to *Nature*:

The lantern is now used for so many purposes—scientific, photographic, and recreative—than any improvement in its construction will be acceptable. When we look into this instrument whilst at work we must be disappointed at the large quantity of light lost by reflection and by dispersion—light which ought to go to the illumination of the screen. In the ordinary form of the lantern three lenses of dense glass are employed as condensers. Each of these six surfaces reflects and scatters the light, and the glass itself is absorbent of its rays.

The dioptric construction of the projection lantern has been well worked out by Messrs. Wright, Newton, Salomons, and others, but the catoptric principle, which would eliminate almost entirely these disadvantages, has been scarcely at all studied.

Although my experiments have been made solely with the limelight in various forms, the following remarks may equally apply to light given by the electric arc:

If a reflector be used, instead of the ordinary condensers, it is obvious that the position of the lime cylinder must be reversed. This will present no difficulty, for the tube holding the jet can be bent into a helical form. The dark image of the lime cylinder also will have no more practical disadvantage than is experienced by a like image formed by the small plane speculum of the Newtonian telescope.

As to the mirror itself, although a parabolic form is the most correct, a spherical surface will be sufficient for mere illuminating purposes, and thus expense may be spared in the grinding of the more difficult curve. A speculum of from 5 to 7 inches in diameter, having a radial curvature of from 2½ to 3 inches, will grasp a large quantity of light, much more than that obtainable from the 5-inch condenser usually employed.

Silver deposited by one of the various reducing processes on the surface of a clear glass lens will have many advantages over a metal mirror. The front surface will give perhaps the finest definition, but by silvering the back part of a spherical glass film, or that of a ground lens, the brilliant surface will remain untarnished for an indefinite time, and the whitish bloom formed by slow volatilization of the incandescent lime is easily removed. The silver film adheres with remarkable tenacity, and it will bear a great deal of heat without blistering or becoming detached.

I have had considerable success in constructing such mirrors from the large ornamental glass spheres blown in Germany, and silvered within by Liebig's process, viz., with milk sugar and ammonio nitrate of silver. A glass sphere of 10 or 11 inches in diameter may be easily cut into eight or nine mirrors by a red-hot iron, and this without distributing the silvering, which will require only gentle friction with a pad of cotton impregnated with a trifle of rouge to brighten it. Thus, at the cost of a few shillings, eight or more mirrors can be made, and also provision be made against possible accidents of cracking by heat.

The light-radiant is so placed that the secondary focus is intercepted by a plano-concave lens of dense glass, as has been happily proposed by Mr. L. Wright. The convergent rays from the speculum are thus made into a parallel beam, which must be deprived of its heat by an alum-trough, for the light and heat at the substage condenser is very great.

Convergence, I find, is usefully promoted by a plano-convex lens of about eight inches focus, placed two or three inches before the above-noted plano-concave lens. In all other respects the arrangements are like those of the usual modern projection microscope.

I have pretty constantly used the ether-oxygen saturator, and I consider it to be perfectly safe, if ordinary precautions be taken. The oxygen, compressed in cylinders, is much recommended, as there can be

no mixture of vapor, except at the right place. The U-shaped horizontal saturator, plugged with flannel, must be well charged with ether, or with the best gasoline, and care should be taken, before beginning or ending an exhibition, to shut off the oxygen tap before closing the ether tap. This will prevent the harmless "snap" from the mixture in the small chamber at the joining of the gas tubes. If a disc more than eight feet be required for the microscope, it will be well to use hydrogen gas instead of ether, since the caliber of the jet cannot in the ether light very well exceed 1¼ of an inch.

As an extra security, I pack the mixing chamber with asbestos-fibre, moistened with glycerine; but, as before urged, the oxygen must leave the saturator, saturated.

To insure the coincidence of the foci of the reflector with the optical axis of the microscope, it will be well to place three adjusting screws in a triangle behind the mirror, and this last may have both a small vertical and horizontal movement.

I claim for this catoptric arrangement a larger grasp of light than can be got from ordinary lenses, and this may be effected also at a small outlay. For the amateur constructor the plan will afford many advantages.

The Action of Alkalies on Glass.

The following facts concerning the action of solutions of alkalies and acids upon glass have been collected from the results obtained by F. Foerster and others who have experimented in this direction:

1. Solutions of caustic alkalies act upon glass much more strongly than water, since, except in very dilute solution, they dissolve all the constituents of the glass as such.
2. Of the caustic alkalies, the most active is caustic soda, then follows caustic potash, and then ammonia and baryta water.
3. Rise of temperature increases the action of the alkalies very considerably.
4. The action of the alkaline solution increases with the concentration at first rapidly, but afterward only very slowly.
5. Highly concentrated solutions at the ordinary temperature have less action than more dilute ones.
6. Pure alkaline solutions, not too highly concentrated, have less action upon glasses than such as have been rendered impure by small amounts of silicic acid.
7. Alkaline carbonates, even in very dilute solutions, attack glass much more strongly than water. Their mode of action corresponds rather with that of other salts than with that of the caustic alkalies. In equivalent concentration, solutions of sodium act more powerfully than those of potassium carbonate.
8. The action of salt solutions upon glass is made up in a manner which varies with the concentration and the kind of salt, of the action of the water itself, and that of the salt which is present.
9. Both these modes of attack are differently influenced by the composition of the glass.
10. Those salts act more strongly than water whose acids form insoluble lime salts. The action of these increases with concentration.

Metallic Chromium Obtained by an Electrolytic Process.

In a recent number of *Comptes Rendus* Mr. E. Placet describes a new electrolytic process by which he has succeeded in obtaining pure metallic chromium, which has formerly been but a laboratory curiosity, and in some cases was not pure chromium at all, but merely a more or less pure carburet of that metal.

To an aqueous solution of chrome-alum he adds an alkaline sulphate and a little sulphuric or other acid. In electrolyzing this solution beautifully brilliant deposits of pure chromium are formed on the negative electrode. Its properties are as follows: It is very hard, has a bluish-white color, resists atmospheric action, and is attacked only by concentrated nitric or sulphuric acid and concentrated solutions of potash. He said that this process may be applied on a commercial scale, which, if true, represents a very important step, as the alloys of chromium, notably those with iron and steel, are becoming of great importance.

He also states that he has succeeded in electroplating brass, bronze, copper and iron with desirable thickness of an adherent deposit of chromium resembling oxidized silver. At the time of reading his paper before the Académie he showed specimens of pure metallic chromium weighing over two pounds, and also samples of chromium alloys and brass ornaments electroplated with chromium.

Useful Information.

Electric Cars.

"Do you know why an electric-car goes uphill slowly, as though drawn by pony mules?" asked an electrician the other day, says the *St. Louis Republic*.

"There are some things I do not know," I responded, "and that's one of them."

"Well, I'll tell you," said he. "There is a certain amount of voltage or electro-motive force distributed over the line, and in order to keep each car running at a general average rate of speed, no car can be allowed to usurp more than its share of pressure. For instance, if one electric car should be thrown wide open and permitted to run uphill, it would for a minute reduce the time of every other car on the road. Hence the motormen have positive orders about slowing down at every pronounced rise in the roadbed."

"Another thing," continued the talkative electrician. "A great many people wonder why there are so many overhead wires along an electric road, and which of them are alive or dangerous. Ninety-nine persons out of a hundred know nothing about it. You have noticed that alongside the pavement on both sides of the street is strung a large, well-insulated wire, almost large enough to be a cable. That is the feeder. In other words, that wire carries the current from the power-house and at certain intervals contributes it to the trolley wire. It is well-nigh impossible for an accident to happen to the feeder, but there would have to be a direct ground connection before much damage could be done. If the feeder should break and fall to the ground, it would emit a blaze which would prove a warning to the passers-by."

"On either side of the trolley wire are two wires which seem to be useless. They are dead and are only intended to shield the trolley. Suppose these wires were not there and a telephone wire should fall across the trolley! Instantly the voltage which transmits the cars would be flashed into every telephone which had a connection, and the result would be a severe shock. As it is, falling wires of any kind are caught by the side wires, and hence never reach the trolley wire. There's your primer lesson in electricity. Some day I will tell you about amperes, volts and ohms."

Rectifying Petroleum.

A new process has been brought out recently by Messrs. Verschave and Barron, says the *American Manufacturer*, for the rectification of petroleum, which practically depends upon the action of the following mixture:

Water.....	10 parts
Liquid ammonia.....	20 "
Nitric acid of about 40° B.....	60 "
	100

This mixture, after being allowed to cool, is placed in a lead lined vessel in which previously about five pounds of finely ground stone, preferably that obtained from Lorraine, have been placed. Into this about 100 litres of distilled petroleum are turned and the whole agitated. It is then allowed to settle for eight to ten hours, the time depending upon the quality of the petroleum. The clear petroleum is then siphoned off, leaving the residue resulting from the treatment with the acid liquid at the bottom. The purification in this process depends upon the joint action of the acid mixture and the decomposition of the stone by the same. The treatment, in addition to removing impurities, removes to a large extent the characteristic odor of petroleum, while it is claimed to diminish its inflammability and increase its lighting power. The treated product is more limpid than ordinary oil, and possesses a faint yellow color.

SOUND is transmitted to the ear by the vibrations of the air. When one particle of air is made to vibrate, it sets the adjacent particles vibrating, and so a sound wave, if not obstructed, passes in all directions from the sounding body. The calculated velocity of sound in the air, when the temperature is at the freezing point, is 915.69 feet per second; but the experiments of Moll Vaubeek and Kuytenbrouwer, performed in 1823, over a distance of 57,839 feet, showed the velocity to be 1089.42 feet per second.

CHROMIUM.—Chromium is a metal, so-called from the numerous coloring compounds it produces. It was first discovered by Vauquelin, in 1797, since which time it has become an important accessory to the list of dyestuffs now in use in the ordinary coloring establishment. Chromium occurs naturally as chromate of lead and chromate

of iron. It is usually obtained in the form of powder or scales, but as a metal it possesses no practical value. The property which characterizes this substance as valuable in the textile world is the bichromate of potash obtained by heating the chrome-iron ore in powder with one-quarter of its own weight of nitre, and then digesting in water. The result of this mode is to dissolve out the chromate or potash, a yellowish salt, and when this material is acted upon by sulphuric acid, it is converted into bichromate of potash. This substance, which is soluble in water, and is extensively used by the dyer and calico printer, readily crystallizes in orange-red crystals.

English and American Locomotives.

An English engineer, writing to the *Engineer*, not long since, gave his experience with English and American locomotives. In explaining why, on a recent occasion, a Baldwin locomotive kept the track while an English engine ran off, he said: Greater flexibility of frames, bogies that follow with the greatest ease the sinuosity of rails, wider wheel-tread, explains, I think, everything clearly for the Baldwin engine. The particular class of engines alluded to by me, had under them bogies as stiff and rigid as the engine frames, central bearings as wide as the bogie frames, long, straight male centers, deep female centers with strong side springs, all this adding to the non-flexibility of bogies; add to this the fact that the bogie was between the engine main frames, the wheels of which rubbed against them on almost all curves, and I think you will see that, as a bogie, it was almost useless.

Often have I watched with painful interest the leading wheels of these bogies while rounding curves. The flanges were soon worn to a sharp edge, owing to the fearful grinding on the edges of the rails; the bosses of wheels soon made deep recesses in axle-boxes, cutting through the flanges of the brasses before they were worn at the crown. The trailing-tender bogies soon showed the same excessive wear on the tires of the leading wheels. This was caused by the weight of the tender being all on side-bearings. Running-tender first caused the wheels to jump the track, and soon great danger was incurred in going over the facing points. The bosses of the engine wheels—the wheels were inside the frames—soon wore deep recesses on the axle-boxes, owing to the rigidity of the frames; the platforms at the cylinder ends worked loose, and after one round trip of less than 200 miles—shed half-way—the engines came in rattling like old mowing machines.

Some Peculiar Effects of Electric Welding.

Some of the men employed at the Kolomna iron works, in Russia, have lately had some unpleasant experiences. Electric welding is practiced there according to the Bernados process. While engaged on the trying work the artificer's were, of course, protected by tinted glasses, but the skin being exposed, the following symptoms were manifested: Burning sensation on the skin and in the eyes; in from three to four hours, discharges from the nose and the eyes; three to four hours later, a dry cough; four to five hours later, swelling of the skin and development of other symptoms; eight to ten hours from the commencement of the disorder, continuous irritation of the eyes, lasting from four to six hours; and, finally, coloring of the skin. Then the various effects ceased, and the skin began to peel. On the third day the cuticle had completely decorticated, and by the sixth all the painful symptoms disappeared. But for weeks afterward the skin remained colored. These effects, it would seem, are exactly the same as those which are induced under scorching by the sun. The best protection which can be afforded the workmen against the evils mentioned, M. Maklahoff, the manager of the works, believes consists in a covering of yellow waxed cloth or red and green veils.—*Electric Review*.

MAGNETS AND THE HUMAN ORGANISM. Experiments have recently been carried out at the Edison laboratory by Dr. Fred Peterson and A. E. Kennelly to prove that no therapeutic effects result from the application of magnetism to the human system. It has been commonly supposed for some time that the magnetism of dynamos has some direct influence upon the bodies of animals, and these experiments were undertaken with a view to settle the question finally. For purpose of experiment the armature was taken from a dynamo, and in the cylinder formed by the inner ends of the set of powerful converging field magnets a dog was confined and kept for a period of five hours.

The intensity of these magnets was from 1000 to 2000 C.G.S. lines to the square centimetre. At the end of the time mentioned the dog was set at liberty, and beyond his apparent joy at thus being set loose the operation did not seem to affect him in the least. A boy was also confined for a short time in the same position, and was also uninfluenced. Several other experiments of like nature were made. Dr. Peterson and Mr. Kennelly conclude from their experiments that the human organism is in nowise affected by the most powerful magnets known to modern science.

PLENTY OF PLATINUM.—There is no fear of the sources of platinum failing to meet the demand; consumers have only to fear trade combinations or "rings." According to the *Journal of the Society of Arts*, there are strata at Bisserski, in the Ural mountains, which can alone supply the total quantity of platinum required for the consumption of the world for many years to come. Platinum is found in Brazil and in the Cordilleras, where it occurs in hard serpentine rocks; it is only in the deposits of the Ural mountains that the metal is found in grains. The richness of the sand in which these grains occur is represented by the figures 17 to 21 grammes of sand. Stories are told in the Urals that, when the demand for platinum was insignificant and the price very low, the goldminers who found this metal in grains while gold-seeking, used to use the grains for shot instead of lead for firing at wild birds. All the platinum extracted from the Ural mountains, after having paid a tax of 3 per cent in kind, is sent to St. Petersburg for treatment and shipment to foreign markets. Throughout the whole world only about 3000 to 4000 kilograms of platinum are annually used, but the consumption steadily increases.

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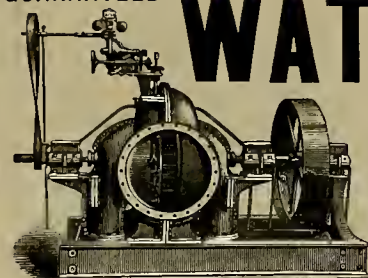
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The End of the Lamp Case.

After several years of legal warfare the question of the absolute ownership of and right to manufacture incandescent lamps has been finally settled and the Edison interests have come out victorious. A decision in the case of the Edison Electric Light Company and the Edison General Electric Company, appellees, against the Sawyer-Man Electric Company, appellant, was handed down by the United States Circuit Court of Appeals on December 15, sustaining the injunction obtained by the Edison Company restraining the Sawyer-Man Company from making, using or vending the incandescent lamp patented by Edison, which has been the subject of the long legal contest. The decision, however, places some restrictions upon the successful parties which will, in a measure, protect those who will be directly affected by it. The court decides that the injunction order appealed from should be so modified as to cover only those lamps made in infringement of the second claim of the patent. It should also contain a provision reserving the right to the defendant to move hereafter for the vacation, suspension or modification of the injunction upon proof of specific instances of refusal on the part of the General Electric company to supply lamps on reasonable terms to the owners of electric-light plants which were installed before the Circuit court decided the validity of the patents. The date of this decision is July 14, 1891. Those concerns which manufactured lamps while the patent was in dispute, the court says, took a risk, and should their interests depreciate on account of being deprived of the use of the lamp, it is their loss, and they must suffer the consequences. The court also says that those who obtained their lamps from infringers are likewise infringers, but those who obtained them before the decision of the Circuit court sustaining the validity of the patent have much stronger equities than have the manufacturers and infringers. As to the legality of the combination known as the General Electric Company the court holds that whether it is legal or not the fact remains that the complainants hold the patent. It is now thought probable that the General Electric Company will at once proceed to stop the manufacture of lamps by those concerns which are now classed as infringers. The Westinghouse people, on the other hand, maintain that their new lamp will be entirely free from the Edison patent, and that the decision will not affect their plans as regards the World's Fair contract.—Electrical Age.

A Storage-Battery Experiment on Ninth Avenue.

An electric car equipped according to the system of the Acme Storage Battery Company of this city is now being operated experimentally on the tracks of the Ninth Avenue Street Railroad. This car weighs 6½ tons, and is provided with 144 cells, each weighing 27 pounds and having a capacity of 140 ampere hours at an average discharge rate of 25 amperes. The grades on the Ninth Avenue road, from 54th street to 116th street, a distance of three miles, are exceedingly heavy, one of them, at the end of the route, being no less than six per cent for a distance of more than 200 feet. On the up trip 31 amperes are usually consumed; a capacity of 75 amperes may be called upon at any time.

The time usually occupied on the up-trip is 24 minutes and 50 seconds. On the return trip, during which the grades are mostly descending, the average current drawn from the battery is 19 amperes, or little more than half of that required on the up-trip. The average time of the down-trip is about 22 minutes and 30 seconds. The entire trip both ways has been made in 47 minutes and 20 seconds. A specially designed motor, the company alleges, is one of the features of this system. The aim has been to make a cell which, while having the least weight for its storage capacity, shall at the same time be so constructed as to avoid the deteriorating influences which have usually caused the rapid destruction of storage cells employed in this class of work. The car made one trip last week when the tracks were in a wet and slushy condition. A fair speed was made and maintained on all the grades. The company manufacturing this system claim that they can run their cars at a cost of only nine cents a mile.

FROM calculations made of the amount of heat given out in a coal-burner and in an electric heater, Mr. P. K. Stern concludes that the former is seven times the latter; or,

in other words, it will take seven times as much coal to produce the same amount electrically as by means of the ordinary coal-burner. But allowing for the difference in price between the hard coal used in stoves and the soft coal in an electrical station, the cost is reduced to about two and one-third times the price of stove or furnace-heating. He points out the fact that in coal-heating there is necessarily a great waste, while in electrical-heating much greater economy can be exercised. This still further reduces the cost of electrical-heating. He mentions an electrical water-heater which is attached to an ordinary faucet in such a way that the cold water on passing through it instantly becomes heated to a temperature which may be regulated as desired. This avoids the use of large quantities of hot water being kept on hand, which naturally represents a vast deal of heat.

Continuous to Alternating Current Transformer.

A most interesting invention of Sir David Salomons and Mr. L. Pyke has for its design and object to change a continuous current of 100 volts and 10 amperes into an alternating current having an electromotive force of 100 volts and one ampere and an alternation rapidity of 1,000,000 per minute. This is ingeniously effected by means of a motor-driven alternator, says the London *Electrical Review*. Hitherto nothing has been accomplished within a tithe of 1,000,000 alternations. The diameter of the machine does not exceed one foot for the rotating portion, and as more than 10 poles to the inch could not well be obtained, the requisite alternation frequency is arrived at without an excessive speed by a simple and highly effective plan, viz, by rotating the field and armature of the motor in opposite directions, the brushes of the commutator proper being carried by the field.

The reactionary effect on the field is necessarily as great as the tendency of the alternator to turn, their speeds being equal, thus 3000 revolutions is equally divided between the two bearings.

The primary current is taken to and the alternating current is brought away from the rotation portion by carefully insulated wires passing through the spindles, which are hollow, being connected to their respective terminals by the device of rings and spindles.

As the whole of the weight is overhung, it is absolutely necessary that the bearings are true, and as the diameter of the polar faces is very small, necessitating very small air space, white metal thrust bearings are employed.

This apparatus will be of great value for the quantitative investigation of phenomena, as yet but crudely explained by means of inappreciable currents.

Sir David Salomons recently exhibited the alternator at the Institution of Electrical Engineers, together with a transformer for raising the potential of the alternating current to 100,000 volts.

Electrical Disinfecting.

Some weeks ago we referred in these columns to the possible advantages of using electrically ozonized air as a germicide, more especially in connection with cholera epidemics; but there are also other methods for preparing disinfectants by cheap electrical processes which may appeal to the public more directly, because instead of the refreshing ozonized air, they involve the use of liquids, which are malodorous, a quality which the public have unfortunately become accustomed to associate with all effective disinfectants to such an extent that now a disinfectant may almost be defined as something which smells worse than the odor of the other poisons in the air. The process which we refer to is that which has long been known as the Hermite process, in which a current of electricity is passed through a chloride solution developing in it hypochlorides, which are powerful disinfecting agents. This process has already been in use largely for bleaching paper, and is, therefore, nothing very new, but its recent introduction at Havre and Rouen, in France, for preparing disinfecting solutions to be used in connection with the cholera epidemics appears to be a new use. The installation required consists simply of a steam engine, a dynamo, the electrolytic bath and a pump. The ordinary sea-water is pumped through this bath and is collected in storage tanks. Unfortunately, no figures of the cost are at hand, but in a case which concerns the protection of a large country like this from the introduction of an epidemic of cholera, the expense, which would probably be small, in this case, ought to play no part whatsoever.—Electrical World.

AN ELECTRIC EXCAVATOR.—The first electric shovel in the United States has just been installed in the works of the Purington-Kimbrell Brick Company, at Purington, a suburb of Chicago. The clay here has previously been excavated by a steam shovel, the scoop being operated by an engine and boiler enclosed in a car, running on a temporary track. The change was made by replacing the steam engine and boiler in the car by a 50 h. p. Thomson-Houston motor, supplied with a current from a generating station several hundred feet away.

IN transmitting electric-power from Laufen to Frankfurt, 108 miles, the actual loss of energy was 18 to 20 per cent in the triple process of transforming a current of from 200 to 300 volts into a current of high intensity but small volume, transmitting this current over naked copper wires on ordinary telegraph poles, and finally transforming it again into a current of ordinary pressure.

THE following pretty experiment is suggested by Charles Wetterer in the *American Machinist*: If iron or steel filings be corroded in a damp atmosphere, and this rust added a little at a time to a jar of diluted sulphuric acid, the crystalline carbon particles that existed in the metal unite to form large crystals; these same will be of the hard diamond form.

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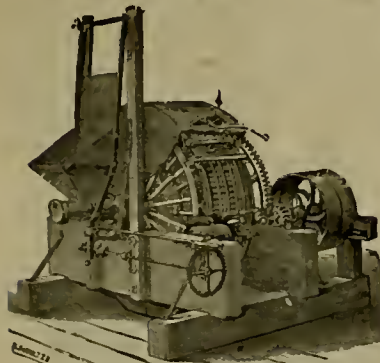
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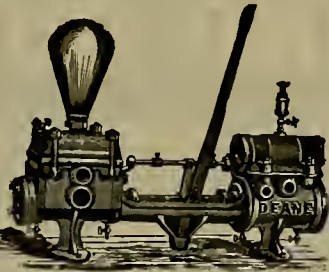
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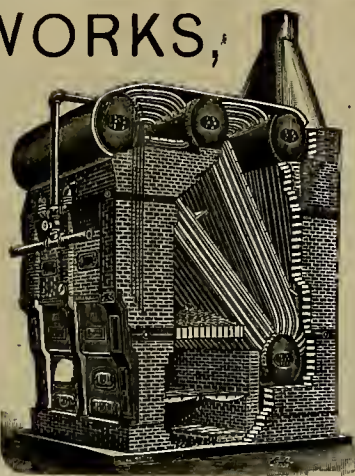
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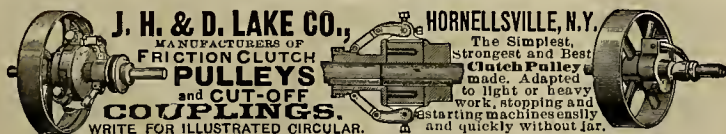
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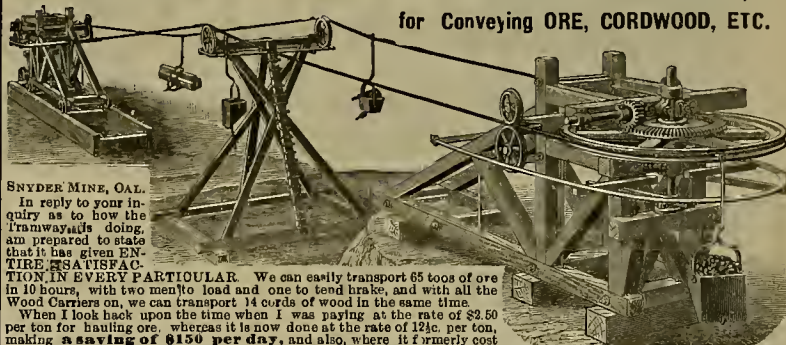
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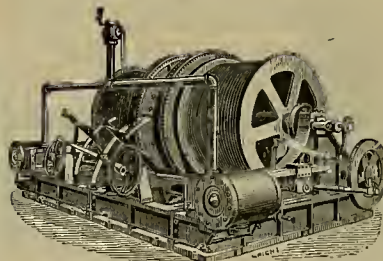
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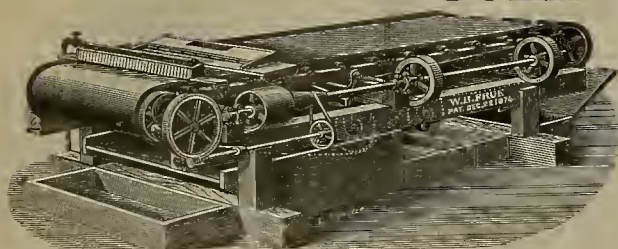
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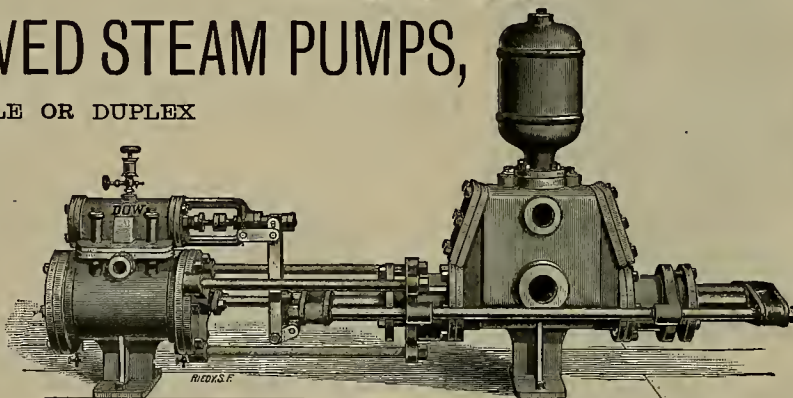
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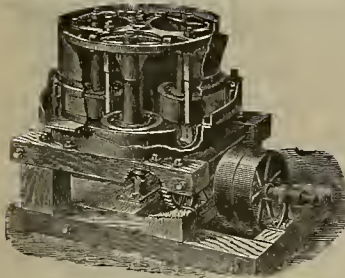
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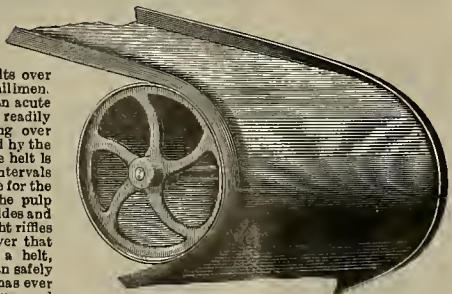
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Butte.

HURLETON MINES.—Oroville *Mercury*, Jan. 9: A rich strike is reported in the Pactolian mine at Hurleton. This mine was recently purchased by a local company, and a force of men placed at work developing the ledge. A tunnel was started in the hill below the first development shaft, and on Saturday, after mining a distance of 50 feet, the ledge was encountered. At the point of contact the ore is marvelously rich, fairly bristling with free gold, besides containing an enormous amount of sulphurets that assays very high. The owners are jubilant and will at once increase the working force. The ledge is from six to eight feet wide, and a mill will undoubtedly be erected. Geo. S. Coleman, superintendent of the Phoenix Mining Co., has a large force of men erecting a mill upon the property. It will be completed in a few weeks and commence crushing ore. The mining prospects in that section never looked brighter.

Napa.

THE MAGNESITE MINE.—St. Helena *Star*, Jan. 6: F. Sievers, of Chiles valley, appeared before the Board of Supervisors Wednesday morning and made the following statement, which we clip from the *Register*, regarding a much-needed highway: "W. P. Bartlett employs at the magnesite mine in Chiles valley in summer, six months, 13 men, in winter, six months, nine men, none of whom get less than \$2 per day, which is an aggregate in summer of \$650, and in winter \$450 per month at least. The hauling at present covers 15 tons daily. This, at \$2 per ton, makes an expenditure of \$30 daily, or \$750 per month. In the six summer months the furnace consumes 25 cords of wood every day, or \$300 per month. All these expenses, aggregating \$1600, are for wages, hauling and wood. This money remains in the hands of the Napa people. Besides this, the teamsters, having about 20 horses, buy all the feed for their stock in the county. The condition of the road over which this business must be done is, and always has been, very miserable. Now it is impassable. Mr. B. has to deliver, under contract, a certain quantity, and if not able to do so from the mines in Chiles valley, he will be forced to abandon the same and go to another county, where the owner of a magnesite mine has made him an offer to work, thus causing a loss of an income of \$1600 average per month to many residents of Chiles valley and Ruthersford. To avoid such a loss, Mr. Sievers proposes to have what he terms the 'cattle trail' between the old mill and the mine, called by courtesy county road," changed for a county road in the valley." The matter was referred to Supervisor Graves, who will lose no time in seeing what can be done to keep so important an interest as the magnesite mine moving in this county.

Nevada.

OSBORN HILL.—Grass Valley *Telegraph*, Jan. 7: The Osborn Hill mine has been bonded by parties in Grass Valley, and in a short time active operations will begin upon the property. The Osborn Hill is considered by mining men who are familiar with the property as one of the best mining prospects in this part of the country. It is admirably located, and in the early days considerable work was done on the mine. Considerable money has been taken from the mine, and a large ledge is there. Active work on the claim will soon begin, and it will make times lively around Union Hill.

Plumas.

RICH STAKE.—*Bulletin*, Jan. 7: From C. R. Thompson we learn that a rich strike was made at the Shenandoah mine last week. From a pocket about \$1000 has been taken already. The vein is about four feet wide and prospects well all through. The ledge is about 100 feet lower than the Mather tunnel and crosses the ravine 200 feet below the falls. It is incased by walls of slate and porphyry. About 25 tons of good-milling ore are on the dump, more hands have been put to work, and the company expects to put up the mill soon.

Shasta.

MINING OUTLOOK.—*Shasta Courier*, Jan. 7: The mining outlook for this vicinity is very good. We understand that several properties will be operated on an extensive scale, and outside capital will take a hand in their development. The dull boom of halting shakes the hills in all directions and the country is full of quartz prospectors, pocket hunters and placer miners, and enterprising owners of small mines are developing their property, for capital is looking for gold-producing mines these days. Muletown mountain promises to be the scene of a big mining boom in the near future. The Parker mine is showing some very rich ore, and a number of other good ledges are being opened. We are in a position to know that big and substantial developments will be made on that hill before many months. Mrs. G. R. Knox of Shasta, and J. Kahny and Aaron Bell of Redding, own a promising location on Muletown mountain, upon which assessment work is being done. Wm. Kellner has got out a lot of good rock, ready to run through his arrastre, near Middletown. The Lost Confidence at Iron mountain is turning out the silver bars, despite the bad weather. The works have run longer this year than usual, as they generally shut down before Christmas. We understand that the Minnesota mill, on Spring creek, which uses the Parmelee process, will start up soon, as they have a lot of good ore out. Mining matters are quiet at South Fork, but indications point to lively times in the

spring. E. L. Ballou is pushing work on his plant. South Fork has got some splendid ore, and all that the camp needs is less "wind-work," and more mining men like Mr. Ballou. That placer and pocket-mining is having a sort of old-fashioned boom in these Shasta diggings, is shown by the shipments of gold dust from this place of late. The men at the Hidden Treasure, on Iron mountain, struck the ledge last week. A 60-foot tunnel will be run in on the ledge and if it continues to hold out as rich as at present, a 10-stamp mill will be erected. The ore is very rich, and an extra force has been put on, making over a dozen men now at work. Grant Schroter intends to begin work on the Schroter mine, near the hospital. They will run a new tunnel on the ledge, and calculate to have the mill running in a couple of months. Farmer has purchased A. Leivisay's interest in the Leivisay and Brewer mine, adjoining the Pacific, owned by Crum and Farmer. Wm. E. Crum and his partner, Farmer, struck a rich pocket in the Pacific mine, about a mile northeast of Shasta, a few days ago, and panned out about 10 ounces of gold in half a day and have good prospects in sight. Crum took out \$250 in this mine some time ago, and "experts" pronounced the ground worked out. Farmer thought a little different, and went to work with Crum, and they soon came to the pocket. The mine is on Rock creek, a short distance below the road-crossing, and the owners, who are practical miners, are confident of striking it "heap rich." A 4-foot ledge has been struck in the New Year mine, near Hogtown, owned by Lorenz Garrecht of this place. Work will soon be commenced on an adjoining location, owned by Garrecht. Both promise to develop into valuable mines. Drury and Paige started up their arrastre this week. The mine is on Middle creek, just outside of town, and is owned by Eli and Oliver Drury, and Jim and Harry Paige. The mine is an old one, but the present owners have discovered that there is something in it too valuable to let it lie idle and will work it in earnest. Panfuls of dirt taken from any part of the mine show excellent prospects. They have a 200-foot tunnel showing a ledge from one to four feet wide. They calculate to run about four tons, averaging \$12 a ton, through the arrastre daily.

Siskiyou.

BLUE GRAVEL.—Yreka *Journal*, Jan. 11: Lee, Lash & Co., of the Greenhorn Blue Gravel mine, have shut down operations for the present, or until a new pump is procured to drain the claim. The water can be easily handled with a good pump, as they have a first-class steam engine to work one successfully. The company has a large extent of ground to work, ranging from 50 to 100 feet to bedrock, the gold being principally found in the blue gravel within 4 to 6 feet of bedrock. The *Ashtand Tidings* says: G. W. Crowson, who was over on Klamath river the first of the week, reports that the Pierson Brothers, of Lane county, have just started their new 4-stamp mill on their claim near the old Anderson ferry, Siskiyou county. One of the Piersons picked up a little piece of float rock on the claim of Crowson & Hills which was rich enough to rate at about \$16,000 a ton. They would like to find the spot where it broke loose from the solid quartz. The *Tidings* also says: L. W. Wright, of Hornbrook, was in Ashland last week, from whom it was learned that a very rich prospect has been struck by himself and a Mr. Cuthbert at a place about two miles from Henley, near C. B. Jilson's house. Those two gentlemen and C. H. Veghte, of Ashland, are interested in the claim, which will be a valuable property, if a ledge is found as the surface prospects indicate. Work was resumed again last week at the Spencer quartz mine, near Coles, just this side of the Oregon line, but the weather is becoming quite cool to cause another suspension, as the water supply is probably frozen again in consequence of the cold temperature of that high altitude.

Tulare.

GYPSUM.—Visalia *Delta*, Jan. 7: Messrs. Marcus Lavelle, Ewell Gilliam and W. F. Hall are interested in a gypsum mine in the Coast Range mountains, and they are selling immense quantities of the plaster for neutralizing the effects of alkali in our soil. The crude gypsum is mined and hauled to Coalinga, where it is ground up in a mill having a capacity of 2500 pounds per hour. The land plaster is very efficacious in its use on alkaline soil, and renders it rich. The gypsum is sown broadcast over alkali spots and then turned under the soil by a plow. The proprietors of the mine have orders for all the gypsum they can mine.

Tuolumne.

RICH DIGGINGS.—Tuolumne *Independent*, Jan. 7: Ed. Ogden discovered rich diggings, on Wednesday last, back of George J. Morgan's house, Matelot gulch, Columbia. Several school children were prospecting there, and Ogden asked them to let him try a pan. In the first pan he obtained nearly \$4 in gold, in the second \$8 and in the third about \$100, making a total of \$130. Some excitement was created and claims in that section are very desirable property.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Virginia *Enterprise*, Jan. 9: 1500 level.—The old east crosscut from the south drift, 30 feet south from the shaft station, has been extended 10 feet; total length reopened, 60 feet. A drain has been placed at the mouth of this crosscut, and water let in through a pipe in the dam is now running along the crosscut to the old slope timbers. The main south drift has been reopened to the sill-floor slope, and we are now closing the winze connection with the 1650 level by filling with waste rock to shut off the heated air and gas which come up from that

level. After doing some necessary work at this point, we will be prepared to resume the work of extracting ore from these stopes. There has been a gradual decrease during the week of gas escaping through the Con. Va. shaft. 1600 level.—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connection with the 1500 level, north drift. 1650 level.—Have continued making necessary repairs to the drifts on the sill floors of this level. Have extracted from the old stopes, eight floors up in the upraise No. 6 carried up from the main northwest drift, and raised to the surface 44 tons of ore; average car assay value, \$30.19 per ton.

OPHIA.—1465 level.—The upraise started on the sill floor, on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground, 101 feet below the sill floor of this level, has been carried up 14 feet; total height, 66 feet, continuing in porphyry showing lines of quartz.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 18 feet; total length, 443 feet; continuing in a porphyry and clay showing lines of quartz.

OCCIDENTAL.—The main north drift, 750 level, has been extended 17 feet; face in low-grade ore. Have been cutting out a station in south drift, 750 level, where winze No. 2 was started near the foot of the upraise. Crosscut No. 2 from Zaidig drift, Suro tunnel level, has been advanced 17 feet; total length, 120 feet. The face is in porphyry and quartz.

BEST & BELCHER.—200 level.—During the past week the northwest drift has been advanced 13 feet through porphyry; total length, 135 feet. 900 level.—West crosscut No. 3 from top of upraise from 100 level has been extended 19 feet through hard porphyry; total length, 49 feet.

GOLD & CURRY.—200 level.—West crosscut No. 5, started 435 feet from main west drift, has been advanced 14 feet during the past week, passing through hard porphyry; total length, 228 feet. West crosscut No. 6 from main north drift has been extended 8 feet; total length, 61 feet; face in quartz and porphyry. On the Suro tunnel level, the joint north drift with Savage Co. has been advanced 18 feet during the past week; total length, 792 feet; face in hard porphyry.

ANNAS.—On the 420 level are retimbering and repairing main north drift. No work has been done in face of north drift run from east crosscut No. 1, north, during the week.

HALE & NOBACROSS.—We continue retimbering main shaft above the 700 level. Main Incline.—Are making the necessary repairs, and are retimbering incline above the 1800 level. 1800 level.—During the week west crosscut No. 1, 80 feet south of the incline was started and advanced 10 feet; face in porphyry. No. 3 west crosscut, north of incline was advanced 13 feet; total length, 218 feet; face porphyry. No. 4 west crosscut, north of incline, was advanced 18 feet; total length, 74 feet; face all in quartz.

EAST BEST & BELOHER AND NORTH GOLD & CURRY.—Drifting is being continued, passing through quartz that looks well.

UTAH.—340 level.—West crosscut No. 3 from the north drift from west crosscut No. 2, at a point 195 feet in from its mouth has been extended 20 feet; total length 64 feet. The face is in quartzite formation, showing clay separations and some water.

NEW YORK.—The west crosscut, 55 feet north of shaft, 850 level, is out 71 feet; face in quartz showing spots of ore, but as a whole of low grade. Shipped to Washoe mill the past week 173 tons 385 pounds of ore; milled during the week 173 tons 385 pounds of ore; on hand at mill, 60 tons; average battery assays, \$31.72; average car sample assays, \$32.74. Shipped to Carson Mint 425 pounds of crude bullion.

WADE SHAFT.—Joint west crosscut on the north line of Alpha, 1800 level, is out 190 feet; face in porphyry. The west crosscut from the northwest drift 300 feet south of the north line of Bullion, 1800 level, is out 155 feet; face in quartz yielding low assays. Heretofore we have been running the blower by means of compressed air, which has been expensive. We are now putting in a water-column in the Ward shaft to enable us to run the blower by a Pelton wheel.

CHOLLAR.—The north drift from the south line, 550 level, is out 75 feet; the face continues in quartz which gives fair assays. Two compartments in the main shaft have been retimbered for 70 feet above the 930 level. The north drift from the east crosscut, 160 feet south of north line, 930 level, is out 71 feet, following a clay wall, on the west side of which there are bunches of quartz, which yield fair assays.

BULLION.—East crosscut, 160 feet north of top of upraise, from east crosscut 320 feet south of north line, 1300 level, is out 26 feet; the face is in quartz and porphyry. The West crosscut from the northwest drift, 300 feet south of north line, 1800 level of Ward shaft, is out 155 feet; face in quartz yielding low assays.

UNION CON.—The joint Sierra Nevada and Union east drift, 900 level, has been advanced 26 feet; total distance west of shaft, 2795 feet; face in porphyry and small seams of clay, from which there is a strong flow of water.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 30 feet; total distance, 536 feet; face in soft porphyry with stringers of quartz and clay. The joint Sierra Nevada and Union west drift, 900 level, was advanced 26 feet; total distance west of shaft 2795 feet; face in porphyry and small seams of clay, from which there is a strong flow of water.

EXCHEQUER.—The joint Alpha and Exchequer east crosscut on north line of Alpha, 1800 level of the Ward shaft, is out 190 feet; face in porphyry. Heretofore we have been running the blower with compressed air, which has been expensive. We are now putting in a water-column in the Ward shaft, to enable us to run the blower with a Pelton wheel.

ALPHA.—The joint Alpha and Exchequer east crosscut, on north line of Alpha, 1800 level of Ward shaft, is out 190 feet; face in porphyry. Heretofore we have been running the blower with compressed air, which has been expensive. We are now putting in a water-column in the Ward shaft, to enable us to run the blower with a Pelton wheel.

SILVER HILL.—The southeast drift has been advanced during the past week 6 feet; total length, 21 feet; the face is in hard porphyry.

POTOSI.—The east crosscut from Potosi winze station, 100 level, has been connected with the west crosscut from top of raise from the 1100 level, giving us good ventilation. A drift was started from the southeast corner of the raise, which is now out 3 feet; face in porphyry. Extracted and sent to the mill the past week 316 tons 1500 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 300 tons; on hand at mill, 88 tons 1150 pounds. Average battery assays, \$25.40. Average car sample assays, \$31.10. Shipped to Carson Mint, 538 pounds of crude bullion.

Pioche District.

NEW COMPANY.—Pioche *Record*, Jan. 7: The certificate of incorporation of the Polaris Mining Company was filed in the county clerk's office this week. F. P. Swindler, Wm. Lloyd and Geo. C. Blanchard Jr. are the incorporators. Working the Poorman group of mines just east of town will form part of the company's immediate operations, and other workings are contemplated in the near future.

Comet District.

GOOD VALUE IN GOLD.—Pioche *Record*, Jan. 7: Messrs. Schaefer, Cohn and Schumann are much pleased over the developments made in their Comet district claim during the past two weeks. They have opened up a mass of ore of unknown dimensions, and are still developing it. The assays vary, but a good portion of the find is shipping ore, and a carload will be sorted out and shipped within two weeks. The high value in gold which the ore carries makes the matter interesting. Comet district created much excitement here a few years ago, it will be remembered, and much work was done there; but the ore developed was mostly low-grade. Numbers of the claims are still maintained, but this new find is down the mountain-side in the low foothills, easy of access, and promises to develop into an immense property.

Yellow Pine District.

CLAIMS AND PROSPECTS.—Pioche *Record*, Jan. 7: The Grundy group, a massive lead property, lies 3½ miles west of the Springs. The ore is a most desirable quality for smelting, being carbonate of lead in lime (calc spar) and practically free from silica. The vein here also is a fissure in limestone. The group comprises the Grundy and the Maybel claims. On the Grundy the ore vein is from one to five feet wide, and a 100-foot shaft is sunk, exposing 50 feet of ore running 15 per cent lead and 25 ounces silver to the ton, while 50 tons are out on the dump. On the Maybel claim ore is developed for 100 feet in veins running from 4 to 15 feet in width. This ore runs 15 per cent lead and carries 35 ounces silver to the ton, and 100 tons are ready for shipment. These two claims are estimated to yield 50 tons a day. The Hunter group of three claims, the Hunter No. 1, 2 and 3, comes next, situated nine miles west of the Springs. The ore vein averages 10 feet in width, and though no development work has been done, ore is exposed and ready to mine for 200 feet on the surface, which will average 40 per cent lead and 35 ounces silver to the ton. Twenty-five tons a day is the estimated output here. Two other good locations, the Shansandoa Nos. 1 and 2, are situated 9½ miles west of the springs, in a vein similar to the Hunter group; ore a carbonate and galena, with a lime and iron gangue. Twenty tons are out ready for shipment, and the estimated output of the claim is 25 tons a day. Just east of these, and nine miles from the Springs, lies the Old Timer claim, where workings go down but six feet, while 20 feet of ore is exposed. It is a bed-vein, conforming to the limestone strata, carrying galena ore which averages 40 per cent lead and 30 ounces silver to the ton. Fifteen tons are out ready for shipment. Fifteen miles northwest of the Springs lies the famous old Potosi lead mine, where the Mormons and Indians in early times are said to have run out lead for the manufacture of bullets. The mine is patented and has lain idle for years. The ledge varies in width from 1½ to 12 feet, and has been worked to a depth of 125 feet in one or two places. An average of 40 per cent lead and 25 ounces in silver to the ton is found in the ore, though the surface workings are said to have been nearly pure lead, easy to mine and run into pure metal. About 100 tons of ore are extracted here and 10 tons a day can be relied on from the mine if worked steadily. Three miles southwest of the Springs lies the Columbia copper claim. Ten tons a day can be extracted on present developments, which run to a depth of but 15 feet. In the Maud claim, 9½ miles southwest of Good Springs, a lead deposit is found varying in width from 1 to 16 feet and over. It is a fissure in limestone, the ore a carbonate of lead, with a calc-spar gangue. Fifty feet of ore is exposed in surface workings which are but five feet deep. The ore runs 40 per cent lead and 12 ounces silver, and the claim can be relied on to furnish five tons a day for shipment. The latest reported discovery is the Singer claim, also a lead property, situated

about 8½ miles southwest of the Springs, and it is a promising piece of property. The vein here, like several of the others, is a fissure in limestone, with galena and carbonate of lead ore which will average 60 per cent in lead and 27 ounces in silver to the ton. The surface is scratched in several places, but not deeper than five feet, yet 100 feet of ore is exposed and 15 tons a day can be mined for shipment. This completes a brief review of over 35 ore-producing prospects in Yellow Pine district, showing by something more than mere general assertions what inducements of a mineral character exists in that section of our county to warrant the construction of a line of railway to develop it. Nearly all the claims mentioned are practically undeveloped, yet the extensive showing on the surface justifies the assertion that a year's work, with a railroad's help, will make Yellow Pine district the heaviest lead-producing section of the continent. Work is soon to commence on the 30 miles of road projected north from Goff station on the A. & P. road, and there is little doubt that the work will continue right on 60 miles farther to Yellow Pine. The country is said to be one easy to build over, and everything points to a belief that the whole 90 miles will be in operation by the latter part of next spring.

ARIZONA.

MOHAVE NOTES.—*Miner*, Jan. 9: Eugene Desty has made a number of valuable discoveries in the mountains west of the river. George Dougherty is working on his mine near the Nighthawk and is taking out considerable ore. A large number of new locations were made the first of the year and many old claims were relocated. Work on the Distaff mine is progressing finely. A larger force of men will be put on as soon as possible. Fifty tons of ore from the Gold Bug mine, Weaver district, were received at the Needles mill Friday for reduction. Rouse and Ferraris have a big body of ore opened up in their lease on the Nighthawk mine and are stopping out large quantities. James Dundon and Ike Hunt have a nice body of good ore in the Nighthawk mine, which they are taking out and preparing for shipment. J. W. Munn has a splendid showing in his Lucky Boy mine, in Music mountain. Considerable rich ore is being taken out and prepared for shipment. A number of mines in Aubrey district are showing up in good shape. With a small amount of work a large quantity of high-grade ore has been uncovered in a number of places in the district. The mill in Todd Basin will be started up in about two weeks, Frank O'Dea having leased both mill and Golconda mine. Mr. O'Dea is a first-class millman and will probably make a success of this venture. J. H. Cofer and S. S. Watson returned Monday afternoon from a prospecting trip in Wallapai mountains. They had the regulation prospector's outfit—several horses—and we understand they made a number of locations. Judge Murphy has just had the assessment work on a number of his claims near Cerbat completed. The ledges are large veins, carrying a high percentage of lead, and run from 20 to 30 dollars in gold and silver per ton. Work continues uninterruptedly on the Blake mine, southwest of Kingman. Some fine ore has been struck in the drifts, while a considerable body averaging an ounce in gold has been uncovered. The mine is destined to be a remarkably good property. The gold fields in and around Cerbat, reported in a recent issue of the *Denver News*, are no myth, but a reality. There is gold there, and in paying quantities, should water be got onto the ground. Many of the small ravines show up well in coarse gold. The mines of White Hills are now being worked in a systematic manner. Shafts are being sunk, whims erected, and everything is kept moving steadily along. We expect that as soon as water can be reached in the mines a new era in mining in that camp will be inaugurated. A Denver, Colorado, mining man visited the Eagle and Golden Eagle mines in Weaver district. He says they are immense properties, and with the right method of working will pay handsomely. The property is now owned by Messrs. Monaghan and Murphy, of Needles, and Henry Brown, of Weaver.

BRITISH COLUMBIA.

MINING DEVELOPMENT IN WEST KOOTENAY.—*Nelson Miner*, Jan. 2: The report which E. D. Ingalls, Dominion Inspector of Mines, will shortly present to the Government, will contain interesting information concerning our district. Among other things, a list of the shipping mines is given, and it is stated that the Mountain Chief and Mountain Boomer will also ship ore shortly. The amount of ore shipped to date is estimated at 160 tons, while 40 to 45 tons are being brought down to Kalso weekly, but are not sent on to the smelters as the navigation companies will not guarantee delivery. The correct spelling of the name of the mine which is known as the Rico or Reko appears to be Ruecau. With regard to work done more in our own immediate vicinity, not so much has been heard of it during the past year, as, owing to excitement about the Slocan, the Lardo, Crawford's Bay and other places, attention has been drawn away from the mines on Toad mountain, but still it is satisfactory to know that their owners have faith enough in their properties to stay with them. As to Toad mountain mines: A considerable amount of work has been done on the Silver King. Even if one knew how much, the penalty for divulging the secret (at present) is death, so that it is advisable to keep dark on the subject. On the Dandy, a 400-foot tunnel has been driven, tapping the ledge 120 feet from the surface. A level has been run on the ledge from this tunnel for 200 feet. The assessment work done on the western end of the Inqnois exposed a very large ledge carrying gray copper yielding high assays. Last year's work on the Grizzly Bear was continued and shafts sunk to tap the vein. On the Silver King, also, a shaft has been sunk

on the vein. The Hidden Treasure has had the assessment work only done on it, while the Last Chance, Jim Crow and many others show fair average veins, carrying copper and silver in paying quantities. On Esle Creek, the Poor-man group and others: About 150 tons of ore have been taken from these mines and put through a 10 stamp mill. Results show \$25 to \$30 per ton in free gold and a large percentage in sulphates. Between the Cottonwood Gold Mining Company's property and the Silver King group some very good showings have been discovered, giving assay returns of 40 per cent copper and \$30 gold to the ton. On Hall creek a strong ledge of gold-bearing quartz has been discovered, giving returns of \$10 to \$30 per ton. The placer mining on Hall creek has paid from \$5 to \$10 per day per man, and on Salmon river present indications are that a considerable amount of work will be done there next year. On Rover creek, a shaft has been sunk 20 feet on the upper tunnel of the Whitewater, and a crosscut has been driven 18 feet in the lower tunnel to tap the main ledge. On the Snow Water, a tunnel has been driven 35 feet to tap the vein. Two men will be working there all winter.

COLORADO.

THE PRODUCT OF THE SMELTERS.—*Georgetown Courier*, Jan. 7: The following is the grand totals of the smelters of the Colorado product of gold, silver, lead and copper:

Omaha & Grant.....	\$ 8,641,422 28
Omaha & Grant, Omaha.....	2,406,184 87
Boston & Colorado.....	3,477,198 00
Globe Smelting & Refining Co.....	4,188,315 16
Philadelphia S. & R. Co.....	4,903,302 35
Harrison Red'n Works.....	1,133,003 98
Arkansas Valley.....	1,737,577 52
San Juan.....	1,539,703 33
Colorado S. & R. Co.....	2,137,643 11
American Smelter.....	2,374,625 02
Pueblo S. & R. Co.....	3,627,077 49
Elgin Smelter.....	483,608 97
Holden Smelter, Aspen.....	604,878 00
American Zinc-lead.....	182,796 40
Bimetallic.....	377,799 64
Holden, Leadville.....	100,230 76
U. S. Mint.....	1,120,075 04
Kansas City S. & R. Co. (estimate).....	200,000 00

Colorado product 1892.....\$39,445,641 92

INAHOS SPRINGS NOTES.—*News*, Jan. 7: Messrs. Owen and Oxley have made a very rich strike in their Silver Queen. The Santa Fe shipped upward of 40 tons of ore to the Silver Age mill this week. Egan & Orme report a big strike in Warren gulch. This discovery joins the famous Frontier mine. The Beecher mine in Virginia canyon is being worked by leasers, and is a steady producer of high-grade ore. The Lexington mine is being steadily worked under the management of J. E. Haman. This mine has paid its regular monthly dividends for some time. The Gem and Gem Extension mines are shipping daily several tons of smelting ore. These mines, if consolidated, would make one of the finest enterprises in this end of the county. The Arizona mine is being extensively developed under the management of Dr. J. I. Thomas. This mine has been a heavy producer of high ore in the past, and it will not be long until it will be paying. A. Abbott of Denver, general manager of the Orphan Boy Extension M. & M. Co., was here this week in the interest of that company, which is operating very extensively on Yankee Hill. The Bismarck and Solid Muldoon mines, operated by the same pool, are promising to become paying properties. The location is a most desirable one, being joined on the northwest by the Newton, General Thomas and Mattie mines. The General Thomas, operated by Allen Bros., is a steady producer of free-milling and smelting ore. This property, although having lain idle for many years, is now a bonanza, and the lucky operators will be rewarded with a handsome fortune.

IDAHO.

WILLOW CREEK MINES.—*Cor. Idaho Statesman*, Jan. 7: Dr. Calloway, of Caldwell, has just returned from the Willow creek mines, 20 miles northeast of Caldwell, full of enthusiasm over the prospect there. Some of the ledges, the doctor says, are simply immense, and the top rock runs, in some cases, as high as \$500 gold and silver to the ton. What is better, many of these improve as they are worked. On one of the ledges the top rock assayed \$6 to the ton, and at the depth of 20 feet the assays showed \$43 gold and silver, and apparently thousands of tons of ore within easy reach. The doctor has been in many mining regions in different parts of the country, and says, without hesitation, that he never saw a better outlook for high-paying mines than exists at Willow creek. It is the pretty general opinion here among mining men that a great future is in store for the region in question.

MONTANA.

THE ANACONDA.—*Butte Inter-Mountain*, Jan. 7: The Anaconda and St. Lawrence mines employ a small army of men yet, though no ore is being hoisted from their depths. Around these properties every day may be seen over 120 men engaged in unloading timber, cutting it into shape for the mine and piling up lagging. The timber is arriving every day, the most of it being red fir from Washington and Oregon. The mine will be in splendid shape when work is resumed. At the smelter it is stated that there is ore enough on hand to last for nearly three months, but it is expected that the retimbering of the shafts of the different properties will be completed before that date.

THE MISSOULA.—Two weeks ago the Butte & Boston Company took charge of the Missoula mine and in future will work the property. It is understood that Messrs. Persons and McGovern, who held a lease on the ground for about eight months, cleaned up a snug sum from the ore stopped out above the 100-foot

level. At present a number of miners are employed in developing the shaft to the 200-foot level, from which point crosscutting will begin. The property adjoining the Missoula, which is also Butte & Boston ground, and which is under lease to Dower, Morgan & Co., is yielding some very rich ore.

THE WILD BILL.—The Wild Bill mine, situated near the Grey Rock and owned by the Kleinschmidt Brothers, Lee W. Foster and others, was leased this week to Messrs. Wiseman, Mitchell and Youton. It is understood that the lessees will at once begin work on the property by the sinking of the shaft an additional 100 feet, as soon as the new hoisting works are erected.

THE BOSTON.—During the past week great preparations have been made for the further development of the shaft at the Boston mine, a property bonded last spring by the Alice Company. For several months a force of about 24 men has been employed in development work. Recently a very rich body of ore was uncovered and Superintendent Hall decided to work the property on a larger scale. The machinery in place was much too small for any extended operations, and the hoist being rather cramped a change became imperative. Accordingly, an engine capable of sinking to the 700-foot level was placed on the property this week, a new 50-horsepower boiler was also placed in position and a new hoisting works erected. The improvements will all be completed early next week, when the work of sinking will be commenced.

THE PURITAN.—Perhaps the largest and certainly the richest body of ore yet unmined in the Puritan was struck at a distance of 230 feet in the east drift last Monday, says the *Phillipsburg Mail*. The vein was found on the foot wall and has rapidly widened from the thickness of a knife blade until now it measures over 14 inches of solid galena, carrying large quantities of native silver. The walls in the face of the east drift are 16 feet apart, and the formation is such as warrants the continuance and enlargement of the ore body above described. All the present indications point to the early resumption of all operations on a larger scale than was at first supposed the company would ever attain.

NEW MEXICO.

NO MINERS WANTED.—*Silver City Enterprise*, Jan. 7: A false impression has gone forth that miners are in great demand in this camp (Mogollon). The impression is misleading, as there are miners here in sufficient number to supply the present demand. Those coming here in search of work, unless engaged before starting, do so at their own risk, and it is to be hoped that this warning, given in a friendly spirit, will be accepted in the same spirit in which it is tendered.

THE MOGOLLONE.—The mines are working satisfactorily and the output for the present year will attract the attention of capitalists to this long neglected section. The Mand S. mill is kept running without interruption. The Last Chance leasers have been bothered somewhat by their water-supply pipes freezing up, thus interrupting millwork, greatly to their pecuniary loss. It is to be hoped, however, that with continued good weather their troubles may be ended for the season. It is reported here, and currently believed, that the Little Fannie mine will start up very shortly, and possibly one or two other mines in this locality.

OREGON.

A VERY RICH MINE.—*Statesman*, Jan. 7: The Patton mine, of which a great deal is heard just now, is located two and a half miles from the Southern Pacific depot at Ashland. A five-stamp mill is running there now. A clean-up was made last Tuesday from a run of 24 days, 202 tons of ore having been put through, and the yield was 426 ounces of gold, with a mint value of \$6390. There was a previous clean-up of a ten days' run, and the result was \$3340. The mine was discovered about a year ago by the Patton brothers. Sheriff Kelly, of Portland, is the president of the company owning and operating the mine, and he bids fair to be transformed into a full-fledged millionaire. Some of the oldest miners are greatly excited over the wonderful and almost unprecedented yield, and they say the prospect for one of the richest mines ever discovered is right indeed. The farther they go the bigger and better is the lead. If such a yield should be reported away up in some mountain, where men could not climb, nothing could prevent hundreds of people from rushing thither; but, almost on the line of a railroad, this thing excites only a passing remark, except from the overenthusiastic and excitable.

SOUTH DAKOTA.

ORGANIZED FOR BUSINESS.—*Deadwood Pioneer*, Jan. 6: A company of well known Plattsburgh, Neb., gentlemen have bought in on the properties of Josiah Craig, in the Richmond Hill section, and propose to develop on an extensive scale what they believe to be a valuable group of claims. The group comprises 16 claims, lying about 2000 feet south of the Iron Hill. In the lot, good ore has been found on two claims, while a plat of some 20 acres of hill ground has a blanket covering of from 1 to 12 feet in thickness of decomposed rock which runs from \$3 to \$5 to the ton. The first move of the new company will be to build a tramway to Coal creek, about half a mile distant, and work this blanket formation. This work will begin early in the spring, and as soon as it is well under way, a shaft, 5x10 feet, will be sunk on what is supposed to be the main ore body. Two shafts of this size have already been sunk to a depth of 30 feet, and both gave very satisfactory returns. This and other development represents the work of four men from early in November. The gentlemen who have bought in on this promising property are C. H. Parmele and son, Charles Parmele, S. H.

Atwood, G. M. Craig and Judge Newell, all of Plattsburgh. The senior Mr. Parmele, as is generally known, is at the head of the Cass County and other banks; and in this same connection might be noted the expectations of certain well informed Spearfish people, that the same gentleman will establish a bank in that city in the near future. The gentlemen who represent the above company are careful investors, and have sufficient capital to carry out their ideas of mining. Mr. Parmele, Sr., has had extensive practical mining experience in other States, particularly in California.

UTAH.

THE ONTARIO.—*Park Record*, Jan. 9: A few weeks ago the *Record* published an article to the effect that the Ontario Company was considering the feasibility of increasing its facilities, and that Mr. Chambers was then absent in the East to consult with the controlling stockholders. It now seems that the meeting resulted in a decision to build a new and much larger mill than the one now in operation, and it is generally understood that the work of construction will commence as soon as the preliminaries can be arranged. The mill will be built on the hill above the mouth of the old drain tunnel a few hundred feet below the present mill, the site having been surveyed last fall. It will be much larger than the present structure, and will be equipped with the Russell leaching process. The first use the plant will be put to will be to leach the old Nos. 1 and 2 tailings dams, both of which contain silver in paying quantities. After this work is completed, the mill will be put to work on Ontario ore and no more shipments will be made. The *Record* has been informed that the company has decided that a saving can be made by milling its own base ores, as the freight and smelting charges amount to considerably more than the value of the lead which makes the ore base. It has been demonstrated that the lead can be destroyed and the ore leached at a great saving to the company, and as cheap reduction is a great item, the Ontario has decided to make a fair test of reducing its base ores. It is calculated that by the time the mill is constructed and the old tailings dams worked up, that the drain tunnel will be completed and the mine freed of water, which in itself will be a big item in favor of the company's sinking fund, and will be the means of instilling new life and energy into the Park's richest and heaviest producer. Coupled with this proposed improvement, should silver advance to \$1 or over, Park City will witness a forward movement such as the most sanguine never dreamed of, and in the estimation of the writer the construction of this new mill is the first glimmer of light from an approaching dawn that will shine with increasing brightness as the years pass along.

DALY NO. 2 SHAFT.—The Daly No. 2 shaft is 1107 feet deep and is said to be one of the finest pieces of work in the West. The timbering is particularly fine and is as smooth as the walls of a parlor. A drift has been run south 200 feet, and as yet very little water has been encountered. The big pump ordered some time ago for this shaft, is expected to arrive every day and will be placed in position as soon as possible. The pump station, 25x12 feet, has been cut and the steam piping is being wrapped with asbestos, and everything placed in readiness to get the machine in operation on short notice after its arrival. A buckboard has also been placed in the pump shaft and works to a charm. The Daly No. 2 shaft is a complete piece of work and a monument to the skill of the mechanics who constructed it.

Wanted, A Partner

With capital sufficient to develop a gold mine in Shasta county, California. The property is located in the gold belt from which a large amount of gold is being extracted. The mine is showing well so far as work is done, being from 8 to 12 inches in rich ore. The company owns a mill and water rights, with U. S. patent. Plenty of fine timber on the ground. This is an exceptional opportunity for capital. Address, "SHASTA," this office.

Are You Going East?

Take the Santa Fe route. You will find it to your interest to call on or address the undersigned before purchasing tickets. No other line crossing the continent can offer you a trip combining equal comfort and pleasure. The only line running Pullman palace and tourist sleeping cars through to Gallego on the same train every day without change. Personally conducted excursions through to Boston leave every Tuesday. W. A. BISELL, 650 Market street, Chronicle Building, San Francisco.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco: **PACIFIC GAS COMPRESSING Co.** Object, to manufacture all kinds of gases made from chemicals or any substance used for aerating liquids of all kinds and for dental, medical and other purposes. Directors—W. P. Redington, San Francisco; G. W. Fletcher, Berkeley; F. W. Marvin, San Francisco; L. J. Cowgill, San Francisco, and E. J. Calley, Oakland.

PACIFIC GROVE, MONTEREY AND DEL MONTE RAILWAY. Object, to obtain franchises for and the construction of a street railroad from the city of Pacific Grove to Monterey. Directors—J. T. McCresson, H. N. Bryant, A. Barvard, Montfort W. Bell, William H. Chapman, George W. Hopkins and Nathan C. Carnall.

Market Reports.

Financial and Commercial Review.

SAN FRANCISCO, Jan. 12, 1893.

Mexican Silver Trade.

The imports of silver from Mexico at this port, principally by rail, for the quarter ending December 31st compare as follows:

Dollars.....	\$2,673,344	\$3,760,723
Bullion.....	87,935	111,904

Total.....\$2,761,279 \$3,872,627
The receipts for the last quarter were the largest ever reported, despite the unprecedentedly low price of silver, showing that the metal has not yet fallen to the cost of production in Mexico. The receipts for the past two calendar years compare as follows:

Dollars.....	\$6,409,680	\$9,683,351
Bullion.....	267,988	366,492

Total.....\$6,677,668 \$10,049,843
The receipts last year are unparalleled. The shipments of Mexican dollars hence to China and Japan in 1892 were \$10,582,286.

SILVER—The same stagnant conditions rule as for some time past. There was a slight advance in yesterday's quotations over the rates for the week, but it was not material. Delegates from the late monetary conference at Brussels are beginning to return to the United States, and are busy explaining how it was done, or, rather, how it was not done. There is some feeling of expectancy as to next spring's meeting of the conference, and, in many quarters, a genuine belief is prevalent that much good may ensue. They think that the world will by that time have discovered that America considers this a serious and even vital question. At any rate, the recess of the conference is much better than adjournment.

METALS—It is very difficult to discover any new features in any of the metals. At this season of year, transactions are slow and very little is to be noted. Quotations are unchanged from last week.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.....	— @ 13	English, do.....	@ 18
Refined, 10 car lots.....	@ 7 1/2	Black, hammer.....	@ 18
Powdered, do.....	@ 7 1/2	Cast, tool.....	@ 18
Concentrated, do.....	@ 6 1/2	Machinery.....	@ 4
All grades jobbing at advance.		Toe Calk.....	@ 4 1/2
COPPER.		TIN PLATE.	
Bolt.....	@ 22	B. V. steel grad.....	@ 5 3/4
Sheeting.....	@ 22	14x20, spot.....	@ 5 3/4
Ingot, jobbing.....	@ 14	Obacross, 14x20.....	@ 5 3/4
Do, wholesale.....	@ 14	Do, roofing, 14x20.....	@ 5 3/4
Fire Box Sheet.....	@ 24	Do, 20x28.....	@ 11 1/2
IRON.		PIG TIN.	
Bar, base.....	@ 3	Spot @ lb.....	@ 24
Norway, base.....	@ 4 1/2	COAL.	
PIO IRON.		TO LOAD—PER TON.	
Exlighton @ ton.....	20 00/100	Wellington.....	\$3 00
Glenagarnock.....	21 00/100	Greta.....	6 50
Am. Soft, No. 1, 22 00/100		Nanaimo.....	7 50
Oregon.....	22 50/100	Gilman.....	6 00
Puget Sound.....	20 00/100	Seattle.....	6 50
Clay Lane White.....	22 00/100	Coe's Bay.....	5 50
Langdon.....	22 50/100	Camel.....	8 50
Thorndike.....	23 00/100	Egg hard.....	12 00
Gariherrie.....	22 50/100	Cumberland, in sacks.....	15 50
Barrow.....	22 50/100	Do, bulk.....	14 00
Carcoffet.....	22 00/100	Walised.....	7 25
CHROME IRON ORE.		Scotch Split.....	7 50
Per ton.....	10 00/100	Brynmor.....	7 50
LEAD.		West Hartley.....	7 50
Drop, sizes smaller than		TO LOAD—PER TON.	
B. # bag of 25 lbs.....	\$1 85	Australian.....	6 37/100
Do, B. and larger sizes		Liverpool Steam.....	6 50/100
Do, B. and larger sizes		Scotch Split.....	7 00/100
Do, B. and larger sizes		Cardiff.....	7 15/100
Do, B. and larger sizes		Leigh Lump.....	11 00/100
Buck, Balls and Chilled		Cumberland.....	12 00/100
do, # bag of 25 lbs.....	2 10	Egg, hard.....	10 00/100
QUICKSILVER.		West Hartley.....	7 50/100
House trade, pr.....	41 50 @ 42 00	English, to load, 38 @ 90	9 50
For export.....	35 50 @ 36 00	Do, spot, in bulk.....	@ 9 50
		Do, to sacks.....	@ 11 50
		Cumberland.....	9 00/100

Eastern Silver Markets.

NEW YORK, Jan. 12.—The following are the closing prices the past week:

	Silver to London.	Silver to New York.
Thursday.....	36 1/2	83
Friday.....	36 1/2	83
Saturday.....	36 1/2	83
Monday.....	36 1/2	83
Tuesday.....	36 1/2	83
Wednesday.....	36 1/2	83

Mining Share Market.

There have been some advances in prices of stocks during the week, and on several days the market was comparatively active. There is no news of very special interest from the leading properties, unless it was from Potosi, of which several thousand shares changed hands this week. During December there were worked at the Nevada mill 1672 tons of Potosi ore. The gross proceeds in bullion were \$31,866.26, and the cost of reducing the same \$10,935.79. The average assay value of the ore per ton was \$24.42, the gross average per ton \$19.06 and the net average per ton \$13.06. The mill worked the ore up to 78 per cent.

Edward Cahill, one of the oldest members of the San Francisco Stock and Exchange Board, who recently gave up his seat to his nephew, Edward F. Cahill, on account of illness, died in this city Tuesday morning.

At the annual election of officers of the San Francisco Stock Exchange, the old board of officers were elected, consisting of A. F. Coffin, president; W. Edwards, vice-president; Fred W. Hadley, secretary; George T. Marye, treasurer; and O. V. Walker, caller.

At the annual meeting of the Pacific Stock Exchange the following officers were elected for the term: President, R. G. Horn; vice-president, S. Ows; secretary, J. Frank Moroney; treasurer, M. Goldman; caller, J. B. Bourne; executive committee—William Bannan, I. Herzberg, C. Hirschfeld.

At the annual meeting of the stockholders of the Silver King Mining Company 37,370 shares were represented and the following officers elected for the

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVED DELINT AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada.....	10.....	Dec 20, Jan 24 Feb 14	C E Elliott, 339 Montgomery
Belle Isle M Co, Nev.....	17.....	Jan 9, Feb 14, Mar 8	J W Pew, 310 Pine
California Iron and Steel Co, California.....	7.....	Nov 25, Dec 31, Jan 23	F Bonacina, 428 California
Challenge Cons M Co, Nevada.....	13.....	Nov 30, Jan 4, Jan 25	C L McCoy, Mills Building
Commonwealth Cons M Co, Nevada.....	10.....	Nov 23, Dec 23, Jan 24	R B Grayson, 331 Pine
Confidence S M Co, Nev.....	22.....	Dec 24, Jan 26, Feb 15	A S Groth, 414 California
Cora California and Virginia M Co, Nevada.....	3.....	Dec 13, Jan 21, Feb 16	A W Havens, 3/8 Montgomery
Corn Imperial M Co, Nevada.....	24.....	Nov 22, Dec 29, Jan 19	O L McCoy, Mills Building
Crown Point M Co, Nevada.....	59.....	Dec 29, Jan 24, Feb 14	J Newland, Mills Building
Del Monte M Co, Nevada.....	7.....	Nov 24, Dec 27, Jan 17	J W Pew, 310 Pine
East Best & Belcher M Co, Nevada.....	3.....	Nov 23, Dec 29, Jan 13	C H Mason, 324 Montgomery
Evening Star M Co, California.....	7.....	Dec 6, Jan 12 Jan 31	J J Scoville, 320 Sansome
Gold Mountain M Co, Cal.....	4.....	Dec 21, Jan 23, Feb 15	J F Curtis, 325 Montgomery
Gould & Curry S M Co, Nevada.....	103.....	Jan 7, Feb 10, Mar 3	A B Thompson, 369 Montgomery
Hale & Norcross M Co, Nev.....	2.....	Dec 29, Feb 6, Feb 28	T Wetzel, 320 Sansome
Jackrabbit M M Co, Nevada.....	63.....	Jan 6, Feb 9, Mar 2	R C Kelly, 419 O'Callahan
Justice M Co, Nev.....	28.....	Nov 25, Jan 12, Feb 20	K L Moss, 129 Sutter
North Belle Isle M Co, Nevada.....	14.....	Nov 14, Dec 21, Jan 16	J W Pew, 310 Pine
North Gold & Curry M Co, Nevada.....	14.....	Nov 21, Dec 24, Jan 16	C H Mason, 324 Montgomery
Russell Rednetion & M Co, California.....	8.....	Nov 14, Dec 19, Jan 16	J Morizo, 323 Geary
Sag Belcher & Mides M Co, Nev.....	1.....	Jan 5, Feb 7, Feb 27	E B Holmes, 309 Montgomery
Silver Lick Cons M Co, Nevada.....	3.....	Nov 22, Jan 3, Jan 25	W Ladd, 531 California
Sierrita Cons quicksilver M Co, California.....	1.....	Dec 16, Jan 20, Feb 10	E F Stone, 385 Pine
South Eureka M Co, Cal.....	2.....	Jan 4, Feb 10, Mar 6	A Halsey, 328 Montgomery
Utah Cons M Co, Nevada.....	16.....	Dec 13, Jan 19, Feb 9	A H Fish, 309 Montgomery
Yellow Jacket S M Co, Nevada.....	53.....	Dec 6, Jan 10, Feb 14	W H Blanford, Gold Hill

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Con. Hittumous Rock Co, Cal.....	Annual.....	F C Lewis, Phelan Block.....	Jan 16
Orocker M Co, Arizona.....	Annual.....	A Waterman, 309 Montgomery.....	Jan 16
Head Center Con M Co, Arizona.....	Annual.....	J W Pew, 310 Pine.....	Jan 24
Sierrita Cons quicksilver M Co, California.....	Annual.....	C E Anderson, Mills Building.....	Jan 21
Lead Star M Co, Nev.....	Annual.....	W Blundell, 2314 Sacramento.....	Jan 21
Mountain G & S M Co.....	Annual.....	C Hermann, 323 Kearny.....	Jan 16
Nevada Salt and Borax Co.....	Annual.....	H C Vao Dyck, 310 Pine.....	Jan 17
Pacific Coast Borax Co, California.....	Special.....	A H Clough, 163 Sansome.....	Feb 18
Sierra Nevada M Co, Nevada.....	Annual.....	E L Parker, 329 Montgomery.....	Jan 18
Utah Cons M Co, Nevada.....	Annual.....	A H Fish, 309 Montgomery.....	Jan 25

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.....	10.....	L Oshorn, 309 Montgomery.....	Dec 20
Orocker M Co, California.....	10.....	T Wetzel, 310 Pine.....	Dec 19
Great Western Quicksilver M Co.....	25.....	A Halsey, 328 Montgomery.....	Oct 8
Mayflower Gravel M Co, California.....	25.....	D M Kent, 330 Pine.....	Dec 20
Pacific Coast Borax Co, California.....	1.....	A H Clough, 163 Sansome.....	Jan 10
Standard Cons M Co, California.....	10.....	J W Pew, 310 Pine.....	Dec 23

ensuing year: Thomas B. Pehy, president; George C. Hickox, vice-president, and F. A. Berlin, M. A. Jackson and W. A. Jones, directors. J. W. Pew was reelected secretary, and Bank of California treasurer. The secretary's financial statement shows a credit of \$122,327.

At the annual meeting of the Argenta Mining Company Thomas Cole was elected president; J. L. Brown vice president and R. R. Grayson, William Bowers and H. H. Todd directors. R. R. Grayson was elected secretary and G. V. Grayson treasurer.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

The following brief list by telegraph, for Jan. 10, will appear more complete on receipt of mail advices:

Sidney F. Baker, Santa Barbara, combination index device; John T. Bibb, Tacoma, buggy; James T. Bibb, Tacoma, buggy; Frank C. Bieri, San Francisco, bolting and conveying machinery; James E. Chapman, San Jose, border for walks, etc.; Edward C. Emde, Tacoma, steady device for portable engines; Benjamin Holt, Stockton, traction engine; Robert D. Hume, Gold Beach, Or., can-lacquering machine; George Johnston, San Francisco, ore concentrator; Charles B. Kendall, San Francisco, and H. Schake, Baltimore, can-seaming machine; Joseph Kraker, San Francisco, filter; Frank B. Long, Los Angeles, key touch adjuster for pianofortes; William Mann and George Johnson, Los Angeles, butter mold; Newton C. Miller, French Corral, Cal., hydraulic milking apparatus; Charles M. Prever, San Francisco, elevator hatchway attachment; Samuel Rogers, San Francisco, detonating compound; George M. Williams, Santa Rosa, printer's cabinet.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUXILIARY STEERING GEAR.—Herbert I. Wetzel, Oakland, No. 488,746. Dated Dec. 27, 1892. This invention is designed to provide an auxiliary steering gear, which may be instantly put into use in case the main rudder or steering gear is disabled, but which at all other times is out of the way. In the run just above the keel and below the propeller-shaft (that is, in the "dead wood") is made an opening which extends entirely through from side to side, and is of sufficient size to receive a rudder. The thickness of the keel at this point is considerable, and the rudder may be equally thick. The forward portion of the opening has a vertical concave groove in which the front end of the auxiliary rudder fits on pintles, serving to enclose the front edge of the rudder and also limit the amount of its turn in either direction. Ring bolts are fixed in the rear sides of this auxiliary rudder and chains attached, these chains then being led through the counter of the vessel to the deck, where they may be attached to the regular steering chains when necessary. If any accident happens to the main rudder the auxiliary one may be put into use. At all other times it is held firmly in the central position by the steering chains and suitable shackles. The apparatus may be used either temporarily while repairs are being made to the main apparatus, or, if found necessary, it will be found sufficient to guide and control the steamer until she can reach port, where repairs can be completed.

BILLIARD TABLE.—Allen F. Scott and John W. Wright, S. F. No. 488,743. Dated Dec. 27, 1892. This improvement in billiard tables consists in a novel construction of elastic cushions, adjustable corner-supports and attachments

therefor, and intermediate reinforce cushions along the rails. The invention is more especially designed for small, movable tables, which can be used in rooms not large enough for ordinary billiard tables. The table may be, however, of any suitable size. The cushions consist of an endless elastic tube or solid cylindrical band, which is preferably made of elastic rubber. This patent covers, among other things, reinforces, arranged at intervals between the hands and table, and against which the bands are supported. These supplemental supports are designed to support the hands and increase their elastic force between the angles of the table.

CAR COUPLING.—Frank M. Ryan, S. F. No. 488,718. Dated Dec. 27, 1892. It consists of jaws pivoted transversely to the line of travel of the cars so as to swing in a horizontal plane and having recesses formed in their meeting edges for the reception of the head of the draw-pin. In conjunction with these are weighted or spring-actuated levers pivoted to swing in vertical planes having upwardly projecting hooks or lugs which engage the shanks of the draw-pin, holding levers to lock them in position when the coupling is complete and to unlock and open them when the coupling is to be broken. In conjunction with these levers is a mechanism by which they may be actuated.

BATTER-CAKE MIXER AND DEPOSITOR.—Edward Stempel, Alameda, No. 488,721. Dated Dec. 27, 1892. The invention relates to the general class of Kitchen utensils and particularly to a utensil the object of which is to provide a vessel in which the batter may be mixed and from which it may be evenly deposited upon the griddle to form any number of cakes. The batter is mixed in the vessel, and when the griddle is hot the vessel is placed on the stove over the griddle. A valve-rod is operated, which opens a number of apertures in the bottom of the vessel, and the batter flows out evenly and is distributed in a suitable number of cakes over the surface of the griddle. The valve is then closed and the vessel removed from the stove to await the next operation.

WATER-WHEEL.—Clark Taber, Sumpter, Oregon. No. 488,723. Dated Dec. 23, 1892. The invention relates to that class of water-wheels in which the wheel operates within an encircling casing having a fixed abutment, said wheel being provided with radially reciprocating hockets adapted by their withdrawal to pass the abutment and by their projection to form the necessary water chamber in the casing. The patent covers a certain novel construction and arrangement of parts.

QUICKSILVER

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Dynamite and Blasting Powder,

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Directors:

EGBERT JUDSON, ALVINZA HAYWARD, THOMAS BELL, JOHN S. DOE, ED. G. LUKENS (President.)

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, Jan. 12, 1892.

9:30 A. M. SESSION.

50 Alta.....	20c 100 Hale & Norcross.....	90c
50 Belcher.....	25c 100 Justice.....	35c
100 Best & B.....	1.40 310 Powder.....	1.50
100 Bullion.....	1.45 800 Mexican.....	1.40
100 Best & B.....	1.50 100 New York.....	1.45c
200 Bullion.....	1.40 400 Ophir.....	1.55
50 Challenge.....	90c 40.....	2.00
100 Chollar.....	60c 830 Overman.....	25c
100 Chollar.....	55c 700 Potosi.....	2.25
100 Chollar.....	65c 100 Utah.....	2.30
640 Con. Cal. & Va.....	70c 100 Utah.....	1.15
370.....	2.05 108 B. & M.....	1.40
350 Crown Point.....	60c 300 Union.....	1.15
200 Exch.....	10c 100 Utah.....	1.35
400.....	15c 500 Yellow Jacket.....	1.50
100 Gould & Curry.....	35c 135.....	70c

100 Alta.....	20c 100 Hale & Norcross.....	85c
40 Belcher.....	1.40 1500 Justice.....	1.00
60 Best & B.....	1.35 75 Mexican.....	1.40
600 Bullion.....	8c 50 Ophir.....	1.95
100 Chollar.....	65c 325.....	1.50
50 Confess.....	1.10 100 Occidental.....	1.00
40.....	1.15 300 Potosi.....	2.15
200 Con. N. Y.....	45c 550.....	2.10
225.....	50c 1000 Savage.....	1.05
75.....	1.40 550 Sierra Nevada.....	1.35
115 Gould & Curry.....	35c 25.....	1.10
200.....	90c 100 Utah.....	5c

BOOKS ON ASSAYING.

BY C. H. AARON.

Part I.—Gold and Silver Ores.

SECOND EDITION—PRICE \$1.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes where he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Lignite; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 310 12mo. pages, with illustrations well bound in cloth; 1892. Price, \$1, postpaid. Sold by DEWEY PUBLISHING CO., Publishers No. 220 Market Street, San Francisco.

Parts II and III.

Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Etc.

SECOND EDITION—JUST OUT.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Gay Lussac's Method; Volhard's Method; Manipulation; Lead Ores; Copper Ores; Tin Ores; Mercury Ores; Zinc Ores; Nickel and Cobalt; Chromium; Bismuth; Arsenic; Antimony; Sulphur; Salt; Note.

One of the methods given for the Assay of Copper is new, original and exact, as is also one of the processes for Zinc. The book contains 161 pages with illustrations, and is strongly bound in cloth. Much of the original text is reprinted by new matter.

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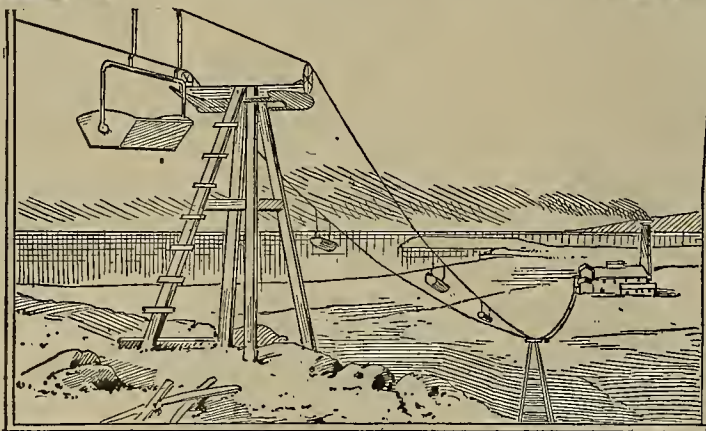
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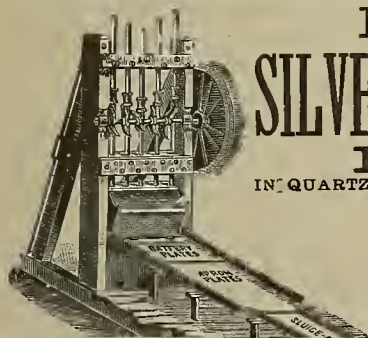
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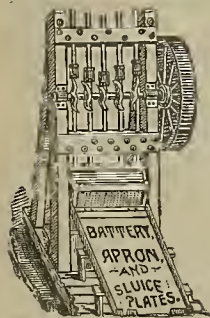
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Restraining the Debris in the Rivers.

At the Drainage and Reclamation Convention which met at Sacramento this week, it was announced that the convention was held for the purpose of hearing facts, plans and propositions, and for the further purpose of determining practical methods and providing ways and means for the relief or permanent reclamation of the overflowed land of the Sacramento valley, and for averting the danger threatened by the annual floods of the Sacramento river and its tributaries. David M. Lubin of Sacramento was elected chairman, and in the course of his introductory remarks expressed the opinion that it was not advisable at this time to antagonize the miners. The farmers might need the miners in their present struggle for drainage and reclamation.

That was a very sensible observation, because if the two classes "stand in" together they can accomplish something, while by antagonizing each other, the whole object is endangered. Senator Ford, of Sierra Co., will introduce shortly a bill providing that the State expend \$250,000 toward the construction of debris dams above the head of navigation in the rivers, to prevent the debris which has accumulated coming farther down. This money is only to be spent in case the U. S. Government appropriates at least an equal amount for the same object. Now, to this reasonable proposition the valley men should agree. They should lay aside their prejudice against debris dams and help themselves and the miners by getting something done. The Caminetti bill now pending in Congress, while it appropriates nothing at present, provides that appropriations may be made for this purpose, and if the State will aid, both the agriculturists and miners will receive the benefit, and the rivers will be improved.

It is not intended to build dams for any particular mines or groups of mines, but to build at such points above the head of navigation of the Sacramento and San Joaquin rivers, and on the main tributaries or branches, or places adjacent, such works as will effect the object of keeping back the material now, or hereafter to be lodged in the tributaries of these river systems, from injuring the navigable rivers. There would have to be both a Government and State Commission, each in control of the respective funds, but empowered to act together. This would provide a practical remedy, and both factions should aid in the passage of the measure when it is presented to the legislature.

MEN who were intending to go to the San Juan placers in the spring, and were not quite sure where their outfit was coming from, can now rest content. If the latest reports are true the whole thing was a fake.

GEOGRAPHICAL SOCIETY OF THE PACIFIC—Lieut. Commander Z. L. Tanner, U. S. Navy, commanding the U. S. S. Albatross, will deliver a lecture on Monday, Jan. 23d, before the Geographical Society of the Pacific, Union Square Hall, 421 Post St., on the subject of "Cable Surveys from California to the Hawaiian Islands." An invitation to attend is extended by the Society to merchants and others interested in the building of a submarine cable-line between San Francisco and the countries bordering on the Pacific. The rooms of the Geographical Society of the Pacific are in the Mercantile Library building, corner Van Ness and Golden Gate avenues, and are open daily from 9 A. M. to 5 P. M. for the convenience of members who wish to consult its files and maps. The latest bulletins of sister societies throughout the world are

The Anti-Debris Association.

Why the new association should call itself the "State" Anti-Debris Association when it only represents half a dozen counties is not quite clear, but that is what it has been named. The executive committee had a meeting on Monday and several new members were added, to take the places of those whose terms of office had expired. The newly admitted members consist of J. M. Morrison and Thomas Jenkins of Sacramento county, W. F. Hoke and T. B. Hull of Sutter county, H. Kraft and G. G. Kimball of Tehama county, and J. A. Saul and E. Casselman of Yolo county. The committee proceeded to elect officers for the ensuing year, and J. M. Morrison, chairman of the Board of Supervisors of Sacramento county, was elected chairman of the committee, and Robert Cosner, Sheriff of Colusa county, was re-elected secretary. E. Greer, whose term of office had expired as a Sacramento supervisor, was elected a member of the executive committee. The other officers will be elected next month. Mr. Wilbur, the manager, desiring to retire his successor will be chosen. For the ensuing year the following finance and auditing committee was appointed: L. P. Farmer, John C. White, Robert Cosner, Thomas Jenkins, H. Kraft and Edward Fagan. For the purpose of properly presenting to the legislature such measures as may be desired for the benefit of the people of the valley, and of opposing such measures as



PLACER COUNTY'S TRIUMPHAL ARCH AT THE MECHANICS' INSTITUTE FAIR.—See page 35.

kept on file. All information at the disposal of the society will be cheerfully given by the assistant secretary, Mr. Thos. F. Trenor. This society was organized in 1881. The president is Prof. George Davidson, and John Parttridge is secretary.

ON Tuesday the McGarrahan quicksilver mine bill was taken up in the U. S. Senate, and an argument in support of it was made by Wilson of Iowa. After some debate the Senate refused to pass the bill over the President's veto by the necessary two-thirds vote. The vote was—ayes 29, noes 18. The bill thus received its death blow for the session.

THE total output of copper by the Old Dominion Copper Co., A. T., during the year 1892, was 8,019,059 pounds, to produce which 34,269 tons of ore and 8,340 tons of lime were used in smelting. The largest production of any previous year was 7,720,015 pounds in 1890.

A CLEAN-UP, amounting to \$118,000, has been received from the Utica mine, belonging to Hayward and the Hohart estate.

THE working force in the Con. Cal. & Va. mine was increased on Saturday last by the addition of 12 men.

may lead to a resumption of hydraulic mining, the following legislative committee was appointed: Hon. William Johnston, Hon. F. R. Dray, Hon. A. H. Rose, John C. White, E. Greer, George Ohleyer, Robert T. Devlin, Edward Fagan, Thomas Jenkins, Hon. J. C. Snowhall, W. H. Garnett and W. P. Craig. The manager reported several cases of violations of injunction, and confessed that his information showed him that Chinamen were the ones who did the greater portion of the illicit mining now being done.

COLONEL D. H. JACKSON, superintendent of the Holmes mine, has returned here from Candelaria. Owing to the prospect of a continued shut-down of the mine because of the low price of silver, Colonel Jackson has called his resignation to the London syndicate who control the property, but has as yet received no reply.

RUTHERFORD B. HAYES, ex-President of the United States, died on Tuesday at his home in Fremont, Ohio, where he had resided since the conclusion of his Presidential term.

THE Standard Consolidated Mining Company of Bodie district has received a bullion shipment, valued at \$17,662.02, representing the December product of the mine.

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San Francisco, January 21, 1893.

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Comment.

For this fiscal year ending June 30th, 1892, there passed through the Custom House at this port 3,104,789 pounds of silver ore. During the same period the amount of duty collected on lead in ores was \$6,964.17. Most of these came from Mexico and Central America countries. The shipments from these sources are increasing quite rapidly, much of what was formerly sent to Great Britain or Germany now coming here. Aside from the benefit to the local smelters the increase of ore shipments to this port is of decided advantage to our merchants and manufacturers, since the owners are apt to make then their purchases at the point where the bullion is obtained. The machinery and mine supplies are sent back from here on the vessels which bring the ores up, so the new trade is of great advantage to San Francisco in every way.

This new Mayor of San Francisco in refusing to sign an authorization of payment for bituminous pavement because it was not done according to specifications has done a good thing, and practically served a notice on contractors that they must do good work or quit. In his veto he says: "This work has not been done according to specifications in the judgment of the Superintendent of Streets. This being the case, it precludes any action looking to payment until the work is done to the satisfaction of the Superintendent of Streets and the board. The only procedure by which contractors have a right to receive payment had better be established at once, and all persons engaged in the contracting business be informed by your action that specifications must be strictly complied with to entitle them to payment." We have always been rather unlucky in this city in the matter of our street pavements, notwithstanding the immense sums spent upon them. This has been mainly due no doubt to careless and inefficient work. In giving up cobbles and basalt blocks, and taking to bituminous rock and asphalt for paving the citizens confidently looked forward to great improvement in the streets. But in many cases good material improperly laid has made people lose faith in bituminous rock. This is a question which interests the mining community, since the bituminous and asphalt deposits of this State are the sources from which the adopted paving material are derived. Properly mixed and laid on a good foundation, a noiseless, clean and durable pavement is produced. But with poor foundations and scant quantity, it cracks and breaks and needs constant repair. The property owners have to pay the full prices for good work according to specifications, but half the time get poor work done. It looks now as if the new Mayor, Superintendent of Streets, and Supervisors

were going to take vigorous action, and compel the contractors to do the work on the streets as it should be done. The Mayor's first veto is a good sign, and it is to be hoped that this will not be a mere spasm of virtue, but establishes a precedent which will be continued.

The Anti-Debris Association has appointed a Legislative Committee to "present to the legislature such measures as may be desired for the benefit of the valley people, and oppose such measures as lead to a resumption of hydraulic mining." It would have been perhaps more polite to have said: "to oppose such measures as may lead to a resumption of hydraulic mining where it does any harm to the streams or adjacent lands." But they qualify it not at all and oppose all hydraulic mining on general principles. The association has also decided to present a memorial to the legislature, giving the present status of hydraulic mining and expressing the objects of the State Anti-Debris Association pending any contemplated legislation. In view of the fact that Congress is dealing with the subject, and that United States courts have decided that hydraulic mining may go on under certain conditions, it is not quite clear that the legislators will see any way to interfere in the matter, even if it wanted to. However, the anti-debris people prefer keeping up the fight for fear that the miners, having gained the point of a favorable Federal court decision, and called the attention of Congress to their condition, may be still further benefited unless there is active opposition.

In all the monstrous scandal occasioned by the Panama canal exposures in Paris, where it has been shown that most of the money has been spent in bribery and corruption, it is pleasant to note that none of the engineering fraternity are implicated. De Lesseps himself was a great promoter, not great engineer. Engineer Fisch of the Comptoir Iron Works testified that the canal company was struggling constantly against the most outrageous demands by contractors. Despite the opinions of expert engineers, the company usually yielded to these demands. This is the only time the engineers have been mentioned as far as we have noticed, and the mention is favorable. It shows that they remonstrated at exactions and overcharges, but that the company went its own way and disregarded their advice. Many persons sent down as engineers were not really of the profession, and doubtless they were put at such places as the contractors desired, as the whole thing was a monstrous swindle from beginning to end. But no engineer of name or distinction has been mentioned as having received bribes, which is greatly to the credit of the profession.

GOLD miners interested in the cyanide process for beneficiation of ores should carefully read and digest Mr. Paul's article on the subject, which appears in another column. This gentleman has had abundant practical experience in all the various details, and from the fund of information thus gained draws freely for the benefit of his fellow-miners. What he says about the methods employed and difficulties overcome will throw much light on the subject. All this should be of decided benefit to the many now experimenting or working with the process. The MINING AND SCIENTIFIC PRESS has devoted much space to consideration of the MacArthur-Forrest process with a view of bringing prominently before the mining public both its merits and demerits. There has been a free discussion and expression of opinion on the part of its friends and those it has disappointed. The opinions of Mr. Paul are entitled to special respect in view of his extended experience; and, while it may be confessed that he is interested in the success of the process in Shasta county at least, it is the belief of all who know him that he is honestly seeking light and endeavoring to perfect a practical working process which may be applied economically to the sulphuretted ores of California.

At a meeting of the executive committee of the State Miners Association on Wednesday the proposed amendments to the original Caminetti bill were discussed. The word "must" inserted by Senator Felton, in place of the word "may" by Mr. Caminetti, compels all miners, whether they already have restraining works or not, to come under the supervision of the U. S. Engineers, and to relinquish their rights to them. The penal clause inserted at the request of C. P. Berry, of the Anti-Debris Association, includes even those mines which are now working without doing damage. As at present amended the bill is objectionable to the miners. At the meeting on Wednesday it was decided to send a representative to Washington to secure, if possible, an amendment to the penal clause to make it apply only to works which do damage to the rivers and which are interdicted by the courts. Niles Searles, of Nevada, was unanimously chosen to go to Washington. John Hays Hammond was elected alternate in the event of Judge Searles' inability to go. A penal

clause was to be expected on the bill, but as at present drawn it works a hardship on the hydraulic mines which have been permitted to work by the U. S. courts. The recent State miners convention objected to Senator Felton's insertion of the word "must" in the bill, and the matter was explained to him. Notwithstanding this, however, he had the objectionable word introduced. The bill is therefore not at all to the liking of the miners, and not what their convention or executive committee indorsed.

Stephen M. White, of Los Angeles, will represent California in the United States Senate in place of C. N. Felton, having been elected by the Legislature on Wednesday last. Burke, the Nonpartisan from San Francisco, and Kerns, the Populist from Los Angeles, voted with the Democrats for White, and thus with the absence of the Republican, McGowan of San Francisco, gave the requisite number to elect. Mr. White was born in this State, and has long been identified with the Democratic party, of which he is one of the foremost orators. In his speech to the members of the legislature after his election he had the following to say on the mining question: "I trust that I may to some extent aid in the passage of that character of legislation which will enable the mining industry of our State to be prosecuted under such circumstances as to avoid interference with agricultural pursuits and so as not to obstruct the free navigation and use of our streams. If mining can under this limitation be carried on (and it appears possible that it can be) it is unnecessary to point out the benefits that will accrue to all from this renewed activity and vitalization of an almost abandoned industry. Our resources cannot be too varied, and we should be loth to abandon any legitimate means afforded by a generous Providence for our advancement." This sounds very broad and very well, and Mr. White must be taken at his word. Nevertheless it will be well for the hydraulic miners of this State to get what favorable legislation they can during this session of Congress. We seem to have some indistinct recollection of years ago, when Senator White was a member of the legislature, and they were discussing debris dams. There was a talk of five per cent. tax, and somebody, to prevent a favorable measure passing, moved to amend by making the tax on gross proceeds 25 per cent., which was practically prohibitory on the mines. Mr. White voted for the 25 per cent. amendment. He may, however, like others, have since experienced a change of heart, but then he may not have done so.

The State Mining Bureau.

A correspondent of one of the daily papers, writing from Sacramento with reference to the probable abolition of the railroad and forestry commissions, says there will be a move also to abolish the State Mining Bureau as a State institution not wanted by either the miners or farmers. The latter class should have nothing to say of the matter one way or another, as they know nothing of it; but the miners of the State are entitled to some consideration, and, as a class, they will seriously object to the abolition of this institution. Mining has done a great deal for this State, but the State has done very little for mining. The Mining Bureau is the only institution maintained by the State for the benefit of the mining industry, and it should be continued without curtailment of any of its features.

This talk arises from the comments of the Governor in his message, relating to the cost of printing of the State Mineralogist's report and the plan upon which the Bureau should be conducted. He recommends that the Trustees be given greater power, and that they select the employees. All the suggestions of the Governor should of course be given due consideration, since he intends them evidently for the improvement of the institution, but he in no way even hints at abolishing the Bureau.

There are doubtless many ways in which the State Mining Bureau could be improved, and it will be well for all interested in it to suggest needed improvements rather than encourage any idea of its abolition, simply because it has not fulfilled all requirements. The reports have been voluminous but discursive. Much which has appeared could have been spared; and much that was wanted has been given no place. But all this could easily be remedied were not the political features given undue prominence. That is to say, with a view of obtaining county and individual influence in the matter of appropriations during legislative sessions, a great mass of matter has been printed which could have been condensed into much smaller compass had this incentive been wanting.

The legislature has insisted on fieldwork and resolved that a specified proportion of the funds should be spent in this direction. This was done owing to a tendency to employ a number of men in the office duties without any special beneficial results that could be noticed. But there is room for useful office work in the collection of dates

and statistics of our State mineral industries. No steps in this direction have ever been taken however. The "field-work" has been construed largely into getting descriptions of mines of interest mainly to their owners.

Thus it will be seen there is room for improvement in the methods of the Bureau but nothing so very radical as to call for abandoning it altogether. Should the Trustees be given greater power and wider duties, then more care should be exercised in their selection. This fact that a man has made money out of mines, or was at one time connected with them, should not alone make him eligible as a Trustee. His fitness for the position should be considered. Many who have been made Trustees have taken very little active interest, attending the meetings occasionally to pass on bills, etc., but giving slight attention to the conduct of affairs. Of the reports they know scarcely anything unless they see them in print. Possibly if invested with more authority, as the Governor suggests, they would take a more active part in the administration of the Bureau. But in that case there is even more need of having suitable men chosen. As there is no salary and no patronage, the position of Trustee of the State Mining Bureau has not been sought for, and the Governors who have made the appointments have done so more out of complacency than with reference to the ability or activity of the appointees.

People in the mining counties should, in the event of a further suggestion to abolish the Bureau, write to the Assemblymen and Senators of their respective counties, strenuously objecting. If no advocates for it come forward, and its enemies do, the natural inference among the legislators would be that it was not doing any good. But the Bureau has many friends all over the State who must rally to its support during the present crisis. The question as to who will be the State Mineralogist has nothing whatever to do with the matter. It is the institution itself which needs support. The Governor will select the man to take charge, and will not do so thoughtlessly, having taken interest enough in the Bureau to suggest the reforms referred to.

Citrus Fruits from Mining Counties.

The citrus fair of the northern district of California is now in progress in the Mechanics' Pavilion, the largest place of assembly in San Francisco. It would amaze some of the old-timers who arrived in the early days in Placer, Butte, Nevada, El Dorado, Yuba and other central northern counties to find such magnificent fruit coming from regions they thought worthless except for gold. In all these counties they still continue to mine, but they also raise many varieties of fruit, among which the oranges are conspicuous. For many years it was thought the citrus fruits could only grow south of Tehachapi pass, but experience has proven to the contrary, and the fruit ripens in some of these upper counties earlier than it does south. The old red ground of the foothills of the Sierra, gold-bearing though it is in places, furnishes the best of soil for the culture of the citrus fruits, now so important among the valued products of the State.

A tour through the Mechanics' Pavilion to-day is an education as to the resources and products of the State of California. It is a marvel both to the Californian and to the stranger. The variety of products, fruit and agricultural, is prodigious. The methods of exhibit are tasteful and satisfactory. The arrangement is splendid and even magnificent. Some displays are very pretentious and strike the beholder with an involuntary feeling of admiration, if not with positive awe. The several county exhibits are without exception in charge of gentlemen and ladies who take an active interest in showing their products, with their numerous and manifold beauties, to all who take the trouble to inspect or inquire. The success of the entire exhibition attests the care, capability and liberality of those who have it in charge.

The county exhibits are in the center of the great Mechanics' Pavilion, visible alike from the ground floor and from the gallery, and each takes up many hundred square feet. From the gallery, where a better perspective can be obtained than from any other point, the ensemble is unique, striking and even magnificent. First comes Placer, the Gateway County, which fully vindicates its appropriate pseudonym by a great triumphal arch whose constituent element appears to be wholly oranges. On the right is Yuba with its artistic windmill of oranges, nuts and lemons. On the left Colusa, with a small but excellent display, and Sacramento with its orange locomotive. At the rear is Butte county, with its great, orange Rock of Ages, fine market pavilion, and handsome grain and fruit palace. Butte county takes up more space than any other, having altogether perhaps 10,000 square feet. Humboldt, Sonoma, Alameda, San Luis Obispo, Sutter, Stanislaus are also represented. Ten years ago it was not thought that orange-trees would thrive in Placer county, which, as its name indicates, had and yet has for its chief industry the operation of mines. Its population depended very largely upon the development of its mineral riches for support, and immigration was attracted thither chiefly by interests and allurements of that kind. About ten years since, however, experiments were made with orange orchards, and it was found that they would produce a fruit of luscious and delicate flavor. From an experiment, orange cultivation rapidly developed into an industry of respectable

dimensions and permanent conditions, and to-day Placer county produces the orange in commercial quantities for export. It is already a source of revenue, and is destined to be a large factor in the growth and development of the county, and a heavy contributor to its wealth and prosperity.

It should be mentioned that Placer makes an auxiliary exhibit of dried and preserved fruits, which have found a station near the arch. It is varied and creditable, and is a fine showing of the county's citrus and other resources, outside the more pretentious and obtrusive fresh-fruit display.

The Placer county exhibit has already received the premium of \$250 for the "most original and attractive exhibit on the opening day." This is exclusive of citrus products. In many places in this county they can drift for gold underground and raise oranges on the surface, doing both farming and mining on the same ground.

Placer county comes first after entrance of the pavilion. The arch, as shown in the cut on the first page, is built on a most imposing and impressive place. It stretches from one side of the vacant space under the gallery to the other. Its dimensions are about 15x80 feet, at a guess. It has three openings—one main in the center and two at the side—and is of the familiar plan seen in all pictures of ancient Roman triumphs, and at our own Fourth of July and other important celebrations. It is well-proportioned and really artistic and finished in its architectural whole. It is in reality a rude wooden structure, but it is so completely and artfully covered with oranges that little of its real supporting timbers or framework is visible. Between 45,000 and 50,000 oranges were used in its make-up, placed in even rows with care and infinite labor. Yuba county has a number of fine displays, arranged and placed on exhibition by various towns and localities. One of the most impressive is that of Smartsville, which is a miniature representation of the California building at the World's Fair. It is the individual production of James K. O'Brien, superintendent of the entire citrus exhibit. It presents a handsome appearance, and the oranges are arranged so as to be displayed to the best advantage. Between 12,000 and 15,000 are required to cover the building. Smartsville is a famous gold-mining camp, but the land is devoted to a "golden fruit" in these days.

Brown's valley is represented by a gigantic bell, covered with oranges. Lemons are also prominent.

Wheatland has a picturesque Eiffel tower, about 12 feet high.

The county as a whole is represented by a full-size windmill, in which oranges, lemons, peanuts, prunes and figs are conspicuously shown. The fans of the wheel are made up largely of gilded peanuts. Windows, doors and other appliances of a genuine windmill are in their proper places and the likeness is carried out to the smallest particular. The wheel is operated by electricity. Surrounding the mill is a neat plot of made-ground, in which appear a pretty water-fall, grasses, mosses, displays of fruit and other pleasing things.

The Yuba county exhibit as a whole is a prominent and inviting part of the entire citrus show, and reflects credit upon the taste, care and liberality of those who got it up.

Sacramento's most unique exhibit is the "citrus locomotive." The locomotive, is built on the narrow-gauge principle, and is equipped with about 35,000 oranges, fastened on to a wooden structure with painstaking diligence and industry. There are also numerous lemons in the make-up, and dried prunes, figs and apricots, peanuts, walnuts, and even Chinese lemons. The dried fruits have been used in appropriate places for making letters, varying colors, and so on. The realistic effect is heightened in a very great degree by the use of real locomotive appliances, such as bell, piston, steam-gauge, oilcups, and signal lanterns.

Butte county, another of the famous mining counties of California, has the most extensive citrus display of any at the fair. That is to say, it occupies more space. It is one of the leading features of the entire exhibition, and has attracted general and most favorable attention. The chief portion is the "Rock of Ages," constructed by the town of Oroville. A "Rock of Ages" made up of oranges might seem an anomaly, but the effect is made realistic by a painted background, representing the stormy sea, and lowering clouds, and a frowning rock boldly appearing from the angry waters. The foreground is an enormous bed of oranges, with lemons arranged here and there in a very pretty manner. The "Rock of Ages" is placed at the rear of the pavilion. The structure is at least thirty feet high and forty feet broad. On the semi-circular frame at the top is a decoration of palm leaves, and under it the inscription "Rock of Ages," in ornamental text, each letter being made of oranges. The cross in the foreground, its base surrounded by rocks, ferns and running water, is also covered with the golden fruit. At the extreme apex of the arch is an electric star, and the whole scene is suffused by the blaze of a search light at night. At nine o'clock each night a tableau is presented, at which a young lady in white comes forth and clings to the cross, in the affecting fashion usually depicted in the familiar allegorical picture. The hand in the meantime plays the grand old hymn.

THE SAN JUAN COUNTRY.—A dispatch from Dandy Crossing, Utah, dated the 17th says: The Navajoes have driven out every party of prospectors crossing the San Juan river. David Menzies and his party made their way back on foot, the horses and pack outfit having been run off by the Indians. Menzies says the Indians are massing and mean trouble. Another dispatch from Colorado Springs, Col., dated Jan. 18th says: J. C. Cox, an old miner, has just returned from the San Juan gold fields. He confirms the statement that the story of a rich find of gold placers was the worst kind of a fake. He says gold is found but not in quantities to pay for mining by any method. Crowds still flock there, although the roads are

lined with hundreds of miners who are leaving. He says there is much privation in the camp. A notice offering \$5000 reward for John Hay, dead or alive, is conspicuously posted at intervals throughout the district. Hay is charged with having originated the fake.

Coast Industrial Notes.

A 50 BARREL a day petroleum flow has been struck at Newhall in a well 800 feet deep.

THE Buckley Lumber Company's mill at Tacoma was burned on the 15th, with a loss of \$20,000.

ANOTHER fine deposit of bituminous rock has been found, the new find being located on the coast about 20 miles below Santa Barbara.

ON Saturday last Bakersfield formally celebrated the completion of the East Side canal, and the formal opening of the Bakersfield and Asphalto railroad.

THE steam launch for the Mohican is being fitted at Mare Island Navy yard with a Ward boiler. The launch for the Independence has a new boiler of the Towne type.

THE total exports of lumber from this port in 1892 were 213,332,533 feet valued at \$495,492. Great Britain took most of this and Australia, Central America, Mexico and South Sea Islands also took large quantities.

NEWS has reached Spokane of the failure of the firm of Moore, Ish & Co., one of the largest general merchandise firms operating in the Okanogan mining country. They had stores at Conconully and Loomiston and also did a general banking business. The failure was due to a recent fire.

THE exports of salmon by water from San Francisco during the month of December aggregated 111,656 cases and 563 packages, the whole valued at \$520,956. For the year 1892 the total shipments were 758,487 cans. There were also 5946 packages of pickled salmon. The value of the shipments for the year were \$3,490,627.

THE Board of Supervisors have granted a franchise to Peter Tauphauss and others of San Francisco to build and maintain an electric railroad between Nevada City and Grass Valley. The *Transcript* says that the road will certainly be constructed, and with as little delay as possible, as surveyors will be put to work immediately to lay out the route preparatory to building the road. The parties obtaining the franchise have ample capital to carry through the enterprise.

A NEW industry has sprung up in the western part of Washington, the making of tannin extract from hemlock bark. The variety used, known as white hemlock, yields a very superior light colored extract, which gives leather a color that can hardly be distinguished from oak tan. The great richness of Washington hemlock is worthy of special note. A recent analysis, by one of the leading leather chemists of the United States shows that it carries 17.8 per cent. tannin, while that of Eastern States will not average over ten per cent.

THE sealers which recently left the port and commenced their course just outside the Golden Gate are having good luck. North coast steamer captains report that they never knew such an extensive or consolidated migration, and the early birds are catching worms at a great rate. The schooner Arthur I arrived with the news that the Emma Louise is in Drake's bay with over 200 skins as the result of a little less than two weeks' hunting. The other schooners that are putting out boats between here and Mendocino are the Edward E. Webster, Mary Brown and the Alexander.

SOUTHERN California growers have demonstrated that fresh vegetables grown in this State can be profitably shipped to the East. This result has more importance than the mere fact that vegetables can be remuneratively raised here for export. It means that settlers cultivating new land for orchard purposes can make their holding return them an income the first year. In setting out new orchards there is always ample room between the rows of young trees for planting small fruits, such as berries and vegetables, without interfering with the growth or development of the orchard. The trouble in the past has been to find a ready market for such product. This has now been secured and is sufficiently extensive to make improbable any oversupply.

Personal.

FRANK McLAUGHLIN, of Oroville, is in town for a while.

W. H. TAGGART, a mining man from Kingman, Arizona, is at the Lick House.

A. T. EMBICH, a mining man from Helena, Montana, is visiting the city with his brother.

W. L. WATTS, of the State Mining Bureau, says that the sandstone found near Sites, Colusa Co., is probably the best in the State.

C. W. BONYNGE, of London, who a number of years ago made a very large fortune out of the Comstock mines, is at the Grand.

MR. A. B. PAUL of Shasta county, who is passing the winter in this city, has taken an office for the present in Room 4, second floor of the Crocker building.

WM. B. WRIGHTMAN, of this city, has been appointed Bank Examiner for California, vice Chamberlain. Mr. Wrightman was for many years private secretary to the late Senator Hearst.

SUPERINTENDENT J. F. PARKS, who has made the Kennedy mine, Amador county, one of the best-paying mines of the coast, must feel happy. The cleanup of last month—\$68,000—was the largest in the history of the mine.

A BODY of ochre, used as a coloring material in paints, has been discovered near Muddleberry canyon, seven miles east of Lovelock, Nev.

Product of the Precious Metals in 1892.

Wells, Fargo & Co.'s Estimate for the Year.

John I. Valentine, president of Wells, Fargo & Co., in his circular on the precious metal product, says:

The following is our annual report of precious metals produced in the States and Territories west of the Missouri river (including British Columbia) during 1892, which shows in the aggregate: Gold, \$30,119,636; silver, \$50,607,601; copper, \$19,370,516; lead, \$11,433,947. Total gross receipts, \$111,531,700. The "commercial" value at which the several metals named herein have been estimated, is: silver, \$87 cts. per oz.; copper, 12 cts. per lb.; and lead, \$4.10 per cwt.

As in former reports, allowance must be made for probable variations from exact figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the Express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a degree, guess work; but with some modifications on this account, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

STATES AND TERRITORIES.	Gold Dust & Bullion by Express.	Gold Dust & Bullion by other Conveyances.	Silver Bullion by Express.	Ores & Base Bullion by Freight.	Total.
California	\$8,961,488	\$1,400,000	\$351,139	\$886,571	\$11,599,196
Nevada	1,978,381	2,632,431	1,403,350	5,414,162	1,130,296
Oregon	945,826	75,000	1,640	1,130,296	412,208
Washington	237,205	25,000	150,000	735,000	735,000
Alaska	785,000				
Idaho	1,790,100	2,424,250	2,636,875	6,761,935	30,911,873
Montana	2,875,000	13,650,000	14,386,873	12,547,336	29,200,939
Utah	23,791	1,383,657	11,139,888	2,397,483	6,738,607
Colorado	4,743,603	19,954,859	4,472,627	3,203,573	268,740
New Mexico	357,820	125,000	114,718	1,639,850	272,192
Arizona	737,605	215,000	237,426	5,492,676	
Dakota	2,955,575	230,000		15,000	
Texas		263,740			
Br. Columbia	272,192				
Totals	\$25,828,450	\$2,625,000	\$41,602,640	\$4,975,610	\$111,531,700

The gross yield for 1892, shown above, segregated, is approximately as follows:

Gold	\$30,119,636
Silver	50,607,601
Copper	19,370,516
Lead	11,433,947
Total	\$111,531,700

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1874-1892.

YEAR.	Production as per W. F. & Co.'s statements, including amounts from British Columbia and west coast of Mexico.	Product after deducting amt's from British Columbia and west coast of Mexico.
1874	\$74,401,045	\$71,965,610
1875	80,839,057	76,703,433
1876	90,375,173	87,219,350
1877	98,421,754	95,311,632
1878	81,154,622	78,276,167
1879	75,349,501	72,638,888
1880	80,167,936	77,232,612
1881	84,604,417	81,198,474
1882	92,411,335	89,207,649
1883	90,313,612	84,639,212
1884	84,975,954	81,633,335
1885	90,151,260	87,311,332
1886	103,011,761	100,160,222
1887	104,645,959	103,287,770
1888	114,341,692	112,665,569
1889	127,677,336	126,723,334
1890	127,176,410	126,804,355
1891	118,237,441	117,946,565
1892	111,531,700	111,259,508

(The net products of the States and Territories west of the Missouri river, exclusive of British Columbia and west coast of Mexico, divided, is as follows:

YEAR.	LEAD.	COPPER.	SILVER.	GOLD.
1874	\$3,300,000	\$29,699,122	\$38,496,438	
1875	5,100,000	31,635,230	39,968,194	
1876	6,040,000	39,292,294	42,836,935	
1877	5,085,250	45,846,109	44,880,223	
1878	3,450,000	37,248,137	37,576,030	
1879	4,185,769	37,032,857	31,470,262	
1880	5,742,390	33,033,055	32,559,067	
1881	6,361,002	42,987,013	30,663,969	
1882	8,098,155	45,133,003	29,011,318	
1883	8,163,560	42,973,101	27,816,640	
1884	6,534,091	43,529,925	26,183,667	
1885	8,662,901	44,516,599	26,393,755	
1886	9,185,192	52,136,851	29,561,424	
1887	9,631,073	50,832,894	32,500,609	
1888	11,203,630	53,162,747	29,937,702	
1889	14,593,323	64,308,637	32,527,661	
1890	11,659,971	62,330,331	31,735,361	
1891	12,355,750	60,614,004	31,686,113	
1892	11,433,947	50,607,601	29,547,444	

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$54,226,465; from San Francisco, \$13,116,059. Total, \$67,342,524, against \$41,379,445 last year. Pounds sterling estimated at \$4.84.

CHICAGO papers are busily engaged in diffusing information that hotel and lodging rates at the World's Fair will be very reasonable and even cheap; and, in proof, submit the following as the average to be charged, ascertained by a systematic canvass of the city: Single room, single bed, one person, \$1.36; double room, double bed, one person, \$2.12; double room, double bed, two persons, \$2.70; double room, two double beds, two persons, \$3.50; double room, two double beds, three persons, \$4.15; double room, two double beds, four persons, \$5.50. The Chicago

press has unwittingly shown that the "gouge" is to be universally practiced by hotel and lodging-house keepers, and private landladies anxious to turn a more or less honest penny by renting rooms. The prices are outrageous. A respectable and comfortable room, for which in Chicago the charge will be \$2.12 per night, can be obtained in San Francisco for fifty cents.

Piru Mining District.

FAIRVIEW CAMP, PIRU DISTRICT, VENTURA CO.

TO THE EDITOR:—In one of my letters to the PRESS I stated that the White Mule Company was putting up a five-stamp quartz mill. I was so informed at that time, and part of the timber and engine were on the ground. But as Mr. Harbell, one of the owners of the mine, was up at Sacramento, attending the State Fair, he saw the Huntington Mill there on exhibition, and had some ore from the White Mule mine worked. He was so well pleased with the Huntington mill that he gave up the idea of putting up stamps, and now the Company has a Huntington 3-foot mill, a Woodbury concentrator, and a Huntington rock breaker and ore-feeder. The mill is built, and everything is in first-class shape to commence grinding out the yellow gold. Mr. Harry Mead superintended the work. He is a first-class millwright, and has had many years experience at the business. George Haylock and W. H. Carpenter are going to put up a mill on the Bunker Hill mine next spring, the mine being opened so as to show hundreds of tons of good paying ore in sight. The Fairview mine has the same class of ore as the Bunker Hill, and is on the same lode. There are several veins on each claim, but the one opened up on the Bunker Hill is 30 or 40 feet wide, assaying from two or three dollars up into the hundreds. I think it will average \$10 or \$15. If it does it is a good mine, as it can be worked very cheap, there being an abundance of good timber for mining purposes and for fuel. That is one great advantage we have in this district—plenty of wood and water for steam mills. Five miles south of this camp is the Piru creek, which furnishes a splendid water power, and the day will come when there will be dozens of mills in this district run by electricity; electrical plants being placed on the Piru and Lockwood creeks. The writer may not see it, but it will be done some day. Everything moves very slowly in this camp. The reason is, all the men who own mines are too poor to rush things, or at least most of them are, and if the mining law was changed as your correspondent, Mr. Ross E. Browne, suggests, they would not be able to pay \$50 cash annually to keep up some mining engineer; neither would there be any more good mines found while doing assessment work. Rich men and big corporations would soon have all the mineral land gobbled up and the poor prospector would go hungry for something to eat. The only chance that the prospectors here have had to get money to buy tools, powder, provisions and clothes, has been by working for men who live at a distance and own mining claims here. The prospector, by getting the assessment work to do, can live and have part of the year to do his own assessment work. Some of Mr. Browne's ideas are good enough, but I want to see the mining laws let alone. The United States mineral laws are all right, and the more they are "tinkered" with the worse it is for prospectors and miners and the better it suits lawyers and surveyors. Again, as to "the granting of extra lateral right to lode claims, i. e., the right to follow and work a lode on its dip into neighboring ground," I know of a good mine which has several thousand dollars worth of machinery and other improvements on it, that, if the owners were not allowed the privilege of following the vein across their side-line, the vein being on so slight a dip or incline, would not be of any value to them. I could put down a shaft just north of their side-line and get the best part of the vein, after they have spent their money following the vein to show me where to sink, and also how far I would have to go to strike their best ground. The law is right and just. I have already said too much, and want to hear from other prospectors on the subject. I am alluding to quartz veins, not placer or hydraulic claims. I. H.

PITTSBURGH COAL AND ITS COMPETITORS.—Pittsburgh coal operators, particularly those shipping by river complain of the growing competition of the Kanawha district and the fields of Kentucky, Illinois and Indiana and farther south of Alabama. In the first-named fields cheaper prices for mining, cheaper coal lands and shorter haulage enable the shipper to place his product in the Cincinnati and Louisville markets at a figure that about represents cost to the Pittsburgh operator. The Pittsburgh coal is conceded to be worth more money, being of greatly superior quality than its rivals, but the argument of the dealers in these markets is that the difference in the quality is equalized by the difference in price, and that goes with the consumer, who after all it is that pays for the coal. It is a fact that during the whole of the long dry season the highest price realized by a Pittsburgh operator for his coal was 8 cents, and that only in a few instances, the bulk going at 7½ cents. This one statement alone is sufficient to indicate how the river coal is holding its place in these markets, during former dry spells Pittsburgh coal easily realizing 10 and 12 cents. It is also a fact that when the two runs that went out on the rise the other day reached Cincinnati that all that was offered for it was 6½ cents. In some instances only 6 cents was bid.—Coal Trade Journal.

It appears that during the past year the production of beet sugar in California increased from 8,000,000 pounds of the previous year to nearly 23,000,000 pounds. The sugar industry is reaching such great proportions that it is likely Congress will meet strong opposition from a new and powerful interest if it attempts to abolish the sugar bounty.

The MacArthur-Forrest Process.

The Results of Work and Experience with Cyanide.

SAN FRANCISCO, Jan. 7, 1893.

TO THE EDITOR:—For several months past I have seen a good deal of literature on the cyanide process, some of which is above the average, and for the inquiring mind highly instructive—notably, the very able and valuable articles of Mr. Chas. H. Aaron; while many more show a creditable desire for information, and some a marked ignorance of the practical features of the process.

My object, in so long maintaining silence, was, that the many critics having their say, without comment, would possibly give me a lesson of value; but thus far I have not been much enlightened by their effusions. During my silence, I have read all, investigated not a little, and in consequence know more; and here I want to say to those who read my article as published in the MINING AND SCIENTIFIC PRESS of July 2, 1892, that I have nothing to take back, not a line to erase or change, but can add much more favorable material, and in a more convenient shape. Every day's practice has been my tutor, and thus I talk from what I know—not think. Allow me here to sum up a great deal, by saying that the cyanide process is coming to the front more rapidly than any new method ever has; for, up to date, many mills, in the various mining States, have adopted the process, while in South Africa it has made wonderful strides. There, the mills are large, some having tanks of 500 tons capacity each. Several new mills are now in progress, and one company has made contracts for working 35,000 tons per month by the process.

California has been considered a wide-awake mining State, but it has to arouse from its lethargic sleep, or be relegated to the rear. In fact, to-day, South Africa is producing more gold than the entire State of California, and yet we boast of possessing the largest area and most valuable goldfields of the world.

Like every new idea, this process has got to pass through the ordeal of defamation by those who have selfish interests to serve, and others who talk wisely on what they think they know. Some of my correspondents have asked why I do not denounce these critical writers against the process; and here I want to say, defending the moneyed interest of the process is not my fight. The Denver Co. is amply able to do that. My object in giving these articles to the public is for the betterment of the gold-producing interest, and to satisfy a laudable desire for information as to practical working. Why I take the interest in the process I do is from the fact that I have been cursed for over 30 years in looking after a vast lot of machinery, the majority of which, with this process, can be dispensed with, and at the same time get better results. But, says one, you are an "interested party." Mr. Geo. A. Garbutt's observations, as published in the MINING AND SCIENTIFIC PRESS of Nov. 12th are as good as a whole page: "By inference, their own statements would not be reliable were they interested; hence their distrust of others." For my part, the reader can estimate my words to suit himself; the best I can do is to give the public the benefit of my experience, although it is a fact, sensibly realized, that I have never been benefited by writing for the public.

All around I see apeings of the MacArthur-Forrest process; this is to be expected, and many will seek to defame the better, even at the expense of pushing forward an inferior one. No higher compliment can be paid the MacArthur-Forrest process than that others are seeking to imitate it. There will no doubt be many attempted improvements, but, as I see it, they must all be of a more expensive kind.

Certainly the process of to-day is cheapness and simplicity itself. What can be more simple than a plant where crushing the ore into tanks is about the only labor and machinery required, and the obtaining of a high per cent a certainty? With this system the millman has peace—he is not distracted by machinery getting out of order, and doubling expenses when laid up for repairs,—this goes right on percolating when you are asleep. In other words, you can run your mill daytime, and the production of gold runs itself at night, or as you may wish. Accepting the proposition that the "world moves," there will no doubt be modifications in some particulars, in fact I consider the "circulating" mode—for the majority of ore—quite an advanced step, if I did first introduce it, but this simply changes the mode of handling both ore and solution. So much for generalities; now for more valuable information.

There are no doubt some who have desired a detailed statement of our ton-working by this process. It is reasonable they should, and this is why it has not been done. After working a number of experimental lots, varying from 50 to 100 tons each, I started on a 500-ton run, intending to cover every important feature and to give the public full details of it; to this point samples of ore were taken regularly, value ascertained, extractions noted, etc., etc. During the time of this run our chemist and assayer was taken sick and writing up of the statistics in full form was delayed; when on the latter part of the run he was taken worse and left for San Francisco, where he died.

After his death I endeavored to work up the details of the run from his books, but found the figures so interwoven with the other work that I could not be certain of its absolute correctness, and abandoned the task. Since, I have had occasion to start a new mill on the process—every part new—and concluded to look after this short run myself, and investigate it in the most minute particular, and especially as the lot of ore was of a very difficult kind for extracting the metal from.

Not any of this ore would yield by general milling 30 per cent of its value. Twelve tons of this lot contained a small percentage of copper, generally objectionable on account of

too heavy a loss of cyanide. Still I concluded to get a lesson myself from working it, with every part of a mill free of one atom of gold belonging to any other run. It must be admitted by every millman of experience that the first run of any new mill is never as satisfactory as the after workings. The quantity of ore for treatment was 32 tons 894 pounds by weight, and having an assay value of \$576.43 or \$17.76 per ton. The result was as follows:

Value of bar.....	\$48.61	being 74	35-100 per cent
Left in solution.....	54.25	"	11 15-100 "
Left in tails.....	32.16	"	5 5-100 "
Leakage of tanks.....	50.49	"	8 75-100 "
Absorption, etc., say.....	.92	"	69-100 "
Totals.....	\$576.43		100 per cent.

By this it will be seen that 94.20-100 per cent was extracted and 85½ per cent saved, and this from ore of a troublesome kind for general mill work.

Gold left in solution could all have been taken up by another run through the precipitating vessels. Gold left in solution is not lost, and an entire precipitation of the gold matters but little when you are working your own ore; you get it next run, without loss of time or extra expense. Leakage of tanks makes quite an item, and but for this the extraction recoverable would have been over 90 per cent. The leakage was from wooden tanks—an abomination. You never can tell in the dry climate of California when they are tight or leaky. Latterly, I eschew them altogether; wooden tanks are cheaper to begin with, but the leakage item ever will condemn them; besides, they absorb both gold and cyanide. Iron tanks are the profitable ones in the end. Cyanide consumed in the above run was 148 21-100 pounds, being 4.53-100 pounds per ton, which, at 55 cents, makes the cost \$2.48 per ton.

Making detailed statements, as the above, is no small matter, either as to time or expense, as you have not only to make bars from the gold slimes, but to destroy all your zinc to ascertain the amount of gold deposited thereon. Measure all your solution, and test for the amount of gold and cyanide it contains, and this you can see means work and loss of time, to no purpose outside of information, and this is the reason so few tests are reported upon for the benefit of the "dear people." My plan of operation is to know the assay of tails after a certain number of solutions have been used, and if the work shows an extraction of from 85 to 95 per cent (according to grade of ore), I let the tails go, knowing full well I will find the metal somewhere; if not in the zinc to-day, it will be there to-morrow. You need not lose anything by this process when once dissolved and washed out, except by leakage and absorption (if you use wooden tanks). I hear a good deal about high extractions, and being unable to get the gold. They admit a high extraction; well, that is one very valuable point settled, and the most important one. A chemist or assayer who can make a correct assay and a high extraction, and then cannot find the gold, seems very odd to me. There is a great inconsistency in this, and my explanation would be, your starting-point is wrong. The greatest trouble, I find, is getting rock with enough gold in it.

In one article of the PRESS I read as follows: "There seems no difficulty in getting the gold into the solution, but there is a good deal of trouble in getting it out. The zinc shavings used by the MacArthur-Forrest process do not seem to accomplish the object—one finds gold wherever the solution flows." I do not find any of this difficulty in any essential particular; neither do I find gold precipitated wherever the solution flows. This is all nonsense, for if such were a fact a better precipitant than zinc shavings would soon be discovered. After reading this paragraph, I took out eight feet of iron pipe through which about \$1000 of solution had flowed, and had the same thoroughly cleaned, the water evaporated, and the residue put into a lead button and the value ascertained to a fraction; the result was 14 mgs. of gold, value about nine-tenths of one cent! To test this matter further, I washed the sediment of the conveying-trough of one set of percolating tanks, 24 feet long, and through which over \$1000 had run as gold in solution. The sediment weighed, when dry, 9¾ ounces. The metal from this was thrown down into a lead button so as to be sure of getting all the gold, the button cupelled, and there was obtained as a result 17.667 mgs. of gold; value, 1 cent 1¾ mills.

I hear a number of queer stories; some go so far as to say they get a high extraction and then cannot find any gold in the solution. This is the worst yet. To take out something and nothing is obtained is a new law in chemistry, and certainly upsets the scientific axiom that nothing is lost. It is all bosh. Errors are never in the manipulator; it's always the process.

Some have said to me, "You have had good luck with the process." It is not good luck at all. It is understanding what to do, and seeing it is done, or doing it yourself. If you are going to work a chemical process, you must obey the law governing it, and nothing is more certain than true results.

To one unaccustomed to a chemical manipulation of ore, it may appear intricate, and that it requires great chemical knowledge, which all miners do not possess; but such is not the case. The process is decidedly more simple, and gives less trouble than an ordinary amalgamating and concentrating mill (outside of the assay department). You simply want a knowledge as to what to do, and this is readily "picked up." There is nothing difficult about it when you once understand it.

There are no doubt instances of failures, that should have been successes, occasioned from this lack of knowledge of details, and especially caring for the gold when deposited and the putting of same into bars. There never was any new system put before the public with so little instruction for a successful outcome, and the wonder is, that under such circumstances, the process has made the advancement it has. From the first there has been too much haphazard way of handling the process, which should not be permitted, instead of a well-conceived and perfected plan of construction and operation. As for a mill, outside of your reducing machinery, there is a good deal to con-

sider for economy of labor in handling both ore and solution. The construction is comparatively inexpensive; at the same time, position of tanks, their purpose and relation, is a very important part. Before starting for the erection of a plant, a well-studied plan should be mapped out. While the process is simple, efficient and easy, when you are running in the right channel, it is apt to bring disappointment when you deviate from the law and start out on some legerdmain work of your own.

Some object to the use of zinc shavings for precipitating the gold. What difference does it make so you get the gold at a trifling cost? I think it will be some time before the present plan will be bettered. With us it does the business quite satisfactory, though at the same time I am ever ready to take advanced steps, when better things present themselves. In the matter of precipitating vessels, you do not want to use wooden ones for economy sake. The white porcelain vessels, as made by the Toronto Pottery Co., Toronto, Ohio, and sold by J. Caire, 521 Market street, San Francisco, are decidedly preferable. They are non-absorbent, and the precipitation is a great deal more active than with the wooden boxes, at least it seems so to me, and I have used both. In these vessels I have had the zinc so heavily loaded with gold that it seemed apparently a web of it, all bright and beautiful. But, says one, we cannot get fine bullion. I can, and why not you? On a trial test I made one bar 994 fine from the "gold slimes" as taken from the precipitating boxes, and this without refining; but I do not care to make bullion so fine—mintable is fine enough, 600. According to the size of the screen used for taking out your gold slimes, will be the fineness of your bar, properly fluxed.

Strength of solution for general gold ores is a branch of the subject to which I have given a good deal of attention. According to instructions I started working with a one per cent solution, and tested on 50 and 100 ton lots at various percentages (on same ore) down to ¼ of 1 per cent, with results very near the same, provided a corresponding increase of time was given in the tanks for dissolving and percolation. It is a settled fact in my mind that the majority of ores at all suitable for the process can be more profitably worked at per cents running from ½ of 1 per cent down to say 15-100 of one per cent.

For quick work a strong solution economizes time; a weaker solution economizes cyanide. Tanks are cheap, and a plentiful supply of them will produce as much bullion, at less cost for working, than fewer tanks with stronger solution. This fact it is well to bear in mind when considering the erection of a plant, and here it is well to remark that calculations made heretofore as to expense of cyanide for working have been based on a one-per-cent solution, so you see that a lower solution, doing as good work, with a fraction more time, is quite a reduction in cyanide expense account. In South Africa, my correspondent informs me that they do most of their work with a solution varying from 20 to 40-100 of 1 per cent in strength.

The loss of cyanide in passing through the zinc depends on the strength of it; as to the destruction of the zinc, that is merely a trifle in dollars and cents. I like to see it pass away rapidly; two pounds of gold, theoretically, will destroy one pound of zinc shavings. To me it is always a very agreeable loss, and about the only loss I know of that gives any satisfaction.

As to the matter of dissolved zinc in the solution being a detriment, as yet I have not observed it; possibly after a given time it might be best to start fresh again.

Some say the process is not suitable for coarse gold. I accepted this idea at first, but have changed my mind on this point, and for this reason: Where the rock is impregnated with coarse gold there is more or less fine, and more, possibly, than it would cost to work the ore, if not a good deal more. This gold, when working the ordinary way for the coarse gold, is lost, while by using the wet or "circulating" plan your coarse gold can be taken up before it reaches the tanks, and thus you get both the coarse and fine gold. Even where you crush dry, and all goes into the tanks together, the same end can be accomplished by taking care when washing out your tanks and being prepared for taking up the coarser gold, and that too coarse for dissolving in profitable time. I made two trials on this point; by running the tails through the "Robinson rifles," all the gold was retained in the three upper rifles, the first the most, of course. I panned 13 rifles separately, so as to be sure. I also had a well-prepared silver plate below the first ten rifles, and not a speck of gold was retained by it.

As to the matter of fine gold, I have written a great deal within the past 35 years on this subject, and yet I have not realized, fully, all the facts that from time to time come up in reference to it. Recent tests, as made by Mr. J. H. Morton, manager of the Mammoth mine of Shasta county, gives quite a valuable lesson on the fine-gold question. Mr. Morton percolated a given quantity of clear water through ten pounds of ore of medium value, and extracted from same 48¾ mgs. of gold and silver, the gold being 22 1-10 mgs. Some years ago I read an account of some experiments to the same point, but passed it by as being possible but hardly realized it. This can, however, be considered as the starting-point for fine gold; and such being the fact, then comes the query how much gold of all grades of fineness is there up to what we denominate coarse gold. When the fine-gold question is fully realized by the millman, then the gold product will be increased, for then he will adapt such ways as secures all of it.

As to the matter of wet or dry reduction of ores, I am decidedly in favor of the wet, using the solution in the battery, and more especially as I see what can be accomplished with a low per cent of cyanide. I will say, however, that dry reduction is always on the safe side. Dry reduction is a big nuisance, destructive to both machinery and men; then what is the use of crushing dry when ore is not to be roasted? You crush dry and then add the solution. My plan is to crush with your weaker and strengthen up in the tanks, if the ore requires a stronger solution. If you use the barrel system, then it is well enough to crush dry. One objects to wet reduction in battery on account of

making slimes. This is the strongest objection that can be urged against it, but this disadvantage I will overcome by low discharge batteries. I work a high discharge and have more or less slimes, but the slime trouble I have fully overcome. One of the mills reduces the ore dry, so I have the whole matter before me to judge from. The dry mill makes more granulated ore, consequently less slime, and percolates some better I admit. Still, the difference, all things considered, inclines me to the wet way, especially as I manage the slimes with ease. I wish, before closing, to impress on the minds of my readers that, in my observations in reference to ores, I refer only to those suitable for the process; all are not, but the majority of gold ore is, yet no one should venture on a plant without testing as to their fitness.

Thus I give the public the results, experiences, thoughts and conclusions of months of labor and thousands of dollars of expense to gain it. If appreciated, it is my pleasure.

ALMARIN B. PAUL.

How Ore is Purchased.

In reply to a correspondent who asked how smelters figure on the smelting charge on ore, or the price to be paid for it, the *Mining Industry and Tradesman* gives herewith the usual rule. Different smelters vary the method a little, but reach practically the same result.

The ore, when it is received, is analyzed for silica, iron, lime, zinc, manganese, or other metalloids or metals it may contain in addition to its assay for gold, silver, lead or copper. Each of these ingredients is beneficial or injurious in a smelting charge. Those which are beneficial are credited with a certain amount for each unit, or per cent, in which they occur in an ore, and those which are injurious are charged with a certain per cent. Silica and zinc are charged for, and iron, lime, gold, lead and copper, when the three latter occur in quantities too small to be paid for, are all credited with some value. Under the scale of prices adopted by smelters, lead, when it occurs in a less quantity than 10 per cent., is not paid for. The same is true as to copper below 2 per cent. and gold below one-twentieth of an ounce per ton. The miner usually supposes that on account of this schedule of prices he is never paid for these metals his ore may contain, if their quantity falls below the percentage or value stated. But he does get pay, in lower smelting charges.

As for silica and iron, equal quantities of each are counted as offsetting each other. If an ore contains more silica than iron, it carries an excess of silica, and each unit or per cent. of the excess is charged for. If it carries more iron than silica, the excess of iron is paid for on the same basis. At the present time iron excess is generally paid for at the rate of 15 cents for each unit, and the excess of silica is charged for at the same rate.

Let it be assumed that an ore carries silica 30 per cent., iron 20 per cent., lead 8 per cent., zinc 12 per cent., gold .04 of an ounce and silver 100 ounces per ton. The balance is sulphur, which is mostly eliminated by roasting, for which there is a uniform charge on all ore requiring roasting of \$2.50 per ton. In estimating the cost of smelting, the charge against the ore would be as follows:

10 per cent. silica excess.....	\$ 1.50
12 " " zinc.....	6.00
Roasting.....	2.50
Smelting.....	4.50
Total.....	\$14.50
The credits would be	
8 per cent. lead at 20 cents.....	\$ 1.60
.04 gold at \$19 an ounce.....	.76
100 ozs. silver at 82 cents less 5 per cent.....	77.90
	\$80.26
Less.....	14.50
Price paid per ton.....	\$65.76

As usually stated the silver only in such ore would be paid for at 95 per cent. of its New York quotation on the day of sale. That quotation would make its value, as stated, \$77.90 per ton, and there would be paid for it \$65.76 per ton, making the apparent smelting charge the difference between the two, or \$12.14 per ton. It will be seen that the owner of such ore gets pay for its lead and gold contents, notwithstanding the buyers do not profess to pay for them when they are found in these small quantities.

Of course ore buyers vary their bids for ore, just as they may need the particular ore on which they are bidding. One smelter may need a siliceous ore, while others do not. In that case the smelter requiring such ore might not charge the silica excess with \$1.50, in which case his apparent smelting charge would be less than that of other smelters which laid upon it that charge. Again a smelter might be in such great need of lead ore that he might be willing to credit the ore with more than 20 cents for each unit of its lead contents, even though it fell below 10 per cent.

Again when different smelters are bidding on a lot of ore, as they do on all lots sold through the public sampling works, each one making his own analysis, there may be a difference in the analysis on silica, zinc, iron or any other of its contents, of even 1 per cent. or a fraction of an ounce of silver, and in such cases there will be a corresponding difference in bids, from men who calculate on the same basis, at the same prices. It is thus that bids on the same ore may differ considerably.

AT Great Falls, Montana, the Sand Coulee Coal Co., is taking out 1,500 tons of coal a day from their Sand Coulee mine, ten miles from the city, and there are a large number of mines being worked that are taking out smaller quantities. The Great Falls coal is used all over the State of Montana and a great deal in the Dakotas. It is an excellent steam coal, and some of the veins are a superior coking coal.

Mechanical Progress.

Silencing Gas and Steam Engine Exhausts.

The London *Journal* "notes" that M. Simon has communicated to *L'Electricien* a suggestion for reducing the noise of gas engine exhausts. He points out that the noise is of two kinds. There is, first, a blow at every discharge; and, secondly, a distinctive note given out by the escape of the gases under pressure, which is always produced whether the exhaust is spasmodic or regular. As a matter of practice, the shock of the first can be mitigated by exhausting into chambers which play the same part as the air chambers of double-acting pumps. Unfortunately this remedy is limited in application by the danger of filling large receivers with gases that may have escaped combustion in the cylinder, and thus compose an explosive mixture. Moreover, this method of regulation creates back pressure, and therefore, for two reasons, it is of limited applicability. M. Simon says that what is wanted is a gradual and insensible diminution of the average velocity of the exhaust gases. The variations of pressure, and consequently volume, would thus be rendered very small, and the violence of the blows would be diminished; while the exhaust gases, having a lower velocity, would no longer give a loud noise.

A system of very acute-angled, conical tubes has been tried by M. Simon himself and others, with the idea that the insensibly increasing cross-section should produce a gradual diminution of velocity. Unfortunately, when the diameter approaches a certain value, the velocity of the gases is no longer equal over any given section, owing to the friction of the sides, which creates a series of vortices that make the tubes quiver, and so produces an effect the reverse of what is intended. M. Simon has substituted for these cones a single, straight pipe, split for a distance of about two meters. The opening is very narrow at the bottom, and widens out until it attains a width equal to the diameter of the tube. The effect produced is remarkable when the right width for the cut has been hit upon; and this can only be done by the method of trial and error. It is no easy matter to split a tube in this way by means of ordinary tools, and alterations are a long and troublesome job. M. Simon has considerably simplified matters by giving the tube a long saw-cut lengthwise; the two halves being then opened out and kept apart by wedges and rings. From such an outlet the puff of exhaust gas spreads out like a fan, and the passage from the tube to the open air is very gradual. Such is the method, at once simple and cheap, which M. Simon has applied to his own satisfaction, and particularly to that of his neighbors, whose quiet was broken by his gas engine. The same device will effectually reduce the noise of steam escaping from a pipe.

Wide or Narrow Tires.

Our readers will be interested in the following from Clem Studebaker, of Studebaker Bros. Manufacturing Co. He says: "There can be no doubt that the general adoption of wide tires would work less harm to poor roads than would narrow tires. Broad tires for wagons, of any width that would be practical, would not, in my opinion make good roads. They will simply have less tendency to cut up poor roads than would the narrow tire. The harm to wagon-roads commonly occurs when the surface is saturated with rain and the road-bed is soft and yielding. At such times loaded vehicles fitted with wheels with narrow tires cut out ruts in the roadway more or less deep, according to the length of the wet spell and the frequency of the passage of such vehicles. When, however, the road-bed is solid and care is taken to promptly fill up inequalities which may be created by reason of the wear and tear of the surface, in such event narrow tires, to all intents and purposes, are no disadvantage to the road-bed, while they are unquestionably of greater advantage to the vehicle. Narrow tires tend to lighten draft in drawing loads over smooth roads and over soft roads. Over surfaces that are sandy or yielding in their nature the wide-tire wagons give the best results. The wide-tire wagons are accordingly better for general field use. We have, by the aid of a dynamometer, made a series of exhaustive experiments with the wide and narrow-tire wagons, and the result of these experiments justifies the statement contained in the foregoing.

"The supply of timber for felloes for wide-tire wagons is less abundant than that

which is suitable for narrow tires. On this account wide-tire wagons are more expensive than those which have the usual tire, and in case of a greatly-increased demand for them, the timber supply of this nature already being somewhat scarce, the tendency will be to still higher prices for wide-tire wagons."

A Trade a Necessity.

Every practical man is often asked by persons in other professions as to the advisability of having their sons taught, and, if a trade, what trade? Now, no matter what may be the social development of the near future, says the *Manufacturers' Record*, whether the present order or society shall be conserved or a new order shall be inaugurated, it is advisable that every boy shall be able to support himself by his hands, and do it as well as he can, by having them trained to the greatest skill they are capable of acquiring; for, if there be no change in the order or classes of society as they now exist, there may be changes in the circumstances of the individual, so that one who to-day adorns the summit of the highest class in society may next year disgrace the calling of a beggar by a failure to make it support him.

This condition is of such frequent occurrence that it may be said to stand across the future of every man as rather more than a possibility. Hence, if a man were master of any modern trade no circumstance could fall upon him hard enough to crush him. Therefore, a trade should be considered a necessity to any man in any condition. The trade to teach a boy is often difficult to decide, but to the right boy the machinist's trade is the best, for in the future, if advance continues to be made on present lines, all things will be made by machinery and all workmen will either be machine makers or machine tenders.

A machine maker must be very skillful, but a machine tender may need but little skill and may command inferior pay; hence, it is fair to assume that the skilled machinist will maintain his superiority hereafter as in the past. As an art, machine building has no equal; it rests solidly on the necessities of the human race; it extends above all other arts and demands of science its most perfect work.—*Manufacturers' Record*.

A STRONG VESSEL FOR THE ARCTIC.—Dr. Nansen's Arctic exploring ship *Fram* was launched at Laurin, Norway, on Oct. 26th, and is thus described in *Engineering*: Length on keel, 101.7 ft.; on water line, 13.2; on deck, 128 ft.; greatest width, 36 ft.; draft, light, 12.3 ft.; displacement, 530 tons. The keel is in two pieces, 14x14 ins., and the covering is 11 ins. thick. The keel is American oak, and the other timbers Italian oak, with the intervals between the timbers filled with a mixture of pitch, tar and sawdust. The inside lining is pitch pine from four to eight inches thick. The outer sheathing is in three layers, of three-inch oak plank, then four-inch oak and finally an "ice cover" of three to six inches of greenheart. The ship's sides will thus vary in thickness from 27 to 30½ ins., and the oak bow is four ft. thick. Various beams and cross-stays strengthen the vessel inside. The *Fram* is pointed fore and aft, and is there further protected by iron-plating. The engine is of 169 I. HP., capable of imparting a speed of six knots, and the coal supply is good for three to four months' continuous steaming. She is rigged as a three-masted schooner. The whole aim of Dr. Nansen has been to construct a strong ship that will lift if pinched between ice floes—and he seems to have succeeded in this aim as near as man can. He will start on his "drift across the North Pole" in June, 1893, sailing direct for Nova Zembla; then to the mouth of the Lena river, and northward from that point until the ice-pack renders navigation impossible.

CANALS are getting to receive much notice from the electric railway engineer, from the fact that almost the same class of machinery is being constructed for use on several of our leading canals as on railways. Along the towpath where the canal horse used to plod even more wearily than his street-railway confrere, modern engineering will construct a trolley-line, and the driver will exchange his lash for an electrical switch-handle. This field is not merely theoretical; the project has been tried and found eminently practical, and seems destined to become of wide commercial interest in the near future. On this head Gov. Flower says in his annual message to the New York Assembly: "Ample water-power for the generation of electricity is accessible along the line of the Erie Canal and could be utilized without great expense."

Scientific Progress.

Dr. Gilbert on Evolution of the Moon.

[At a meeting of the National Academy of Sciences, held at Baltimore, November, 1892, D. K. G. Gilbert, of the U. S. Geological Survey, presented a memoir on the Evolution of the Moon. An abstract of this paper is given in the *American Naturalist* for December, and is reprinted below. In this connection the reader should refer to these publications, volume IV, page 37, where an observation of Dr. Gilbert's on a crater in Arizona is described. This crater was actually formed by a falling meteor. So far as I know, Dr. Gilbert is the first geologist of high standing to give his authority to the hypothesis that lunar craters have, in general, been formed by the bombardment of the lunar surface by meteorites. My own studies on moon photographs do not lead me to the same conclusion. I hope that some of the selenographers of the society, Messrs. Weiner, Elger, Ranyard, and others, may be willing to treat this subject in the publications.—E. S. H.]

Dr. Gilbert said in part: The surface of the moon, like that of the earth, is diversified by plains, uplands and mountains, and these various features have special characters in which they differ from those of the earth. The plains lie lower than other portions of the surface, and are distinguished by their darker color.

By those who have mapped the surface of the moon, they are called seas, but the word is used in a figurative sense, for it is well understood that there is no water on the moon. The mountains are usually in the form of rings, each ring inclosing a hollow, and to this form the name crater is given. They are scattered over the surface of the plains, and on the uplands they are thickly set, overlapping one another in every variety of relation. They are of all sizes, from the smallest that the telescope can discern to a diameter of several hundred miles. Those of medium and larger size are usually characterized by a smooth circular plain in the interior and a hill or group of hills rising in the center of the plain. They differ from the craters of the earth in various ways, especially in the fact that their bottoms are below the level of the surrounding country, and in the fact that the central hill bears no crater on its summit.

The origin of these craters has been the subject of many theories. Despite their marked peculiarities of form, they have more commonly been ascribed to volcanic action; but they have also been referred to the bursting of gigantic bubbles, to the evaporation of water and its accumulation about the point of evaporation, as ice, and to the impact of bodies from without. Personally, I favor the last-mentioned explanation, but I differ from other writers in respect to the origin of the colliding bodies. It has been previously surmised that these might be rocks hurled from terrestrial volcanoes; that they might be meteors from the recesses of space, such as are continually burned in the upper layers of our atmosphere, giving rise to shooting stars, and that they might be aggregates of such meteors constituting balls of cosmic dust. Now, my idea of their origin is based upon the phenomena of the planet *Saturn* and its ring. About that planet is a disc-like ring which astronomers believe to be constituted of an indefinitely large number of very small bodies revolving about the planet in parallel orbits—a symmetrically-shaped form of small satellites. Assume that a similar ring of minute satellites once encircled the earth, and that those gradually became aggregated into a smaller number of larger satellites, and eventually into a single satellite—the moon. The craters mark the spots where the last of the small bodies collided with the surface when they finally lost their independence and joined the larger body.—Publication of Astronomical Society of the Pacific.

ALUMINIUM HORSESHOES—Russia has tried an experiment with aluminium shoes for cavalry horses, which will, no doubt, prove especially interesting to the owner of Nancy Hanks and other flyers. A few horses in the Finland dragoons were shod with one aluminium shoe and three iron shoes each, the former being on the fore foot in some cases and on the hind foot in others. The experiments lasted six weeks, and showed that the aluminium shoes lasted longer and preserved the foot better than the iron ones. No aluminium shoes broke, and they were used over again for reshoeing the horses. Moreover, they were worked over hard and very stony ground. The most important fact of all is that aluminium horseshoes are only one-third to one-fourth the weight of iron shoes.

Converting Heat Into Work.

In a paper recently read before the Manchester Association of Engineers, B. H. Thwaite, C. E., of Liverpool, discussed the economic possibilities of the generation of electromotive force in the coal fields and its application to industrial centers. In defining the most economic and practically ideal method of converting heat into work with the mechanical facts at present available, he says the procedure that will give this ideal method to fulfill the highest practical standard of efficiency and satisfy the exigencies of duty is as follows: 1st. The conversion of the solid fuel into a gaseous condition. 2d. The abstraction of the nitrogenous value from the fuel, and its conversion into a condition suitable for agricultural fertilization. 3d. The direct combustion of such gaseous fuel in the combustion cylinder of a gas motor, for the conversion of the thermic into dynamic energy. 4th. The transformation or transmutation of this dynamic into electric energy, or into electromotive force.

The ultimate possible results of a fuel-gas and gas-motor plant, on a large scale, is, that with such a plant, the dynamic power enclosed in the indicated card of pressure of a cylinder will be equivalent to the raising or elevation of 33,000 pounds one foot high in one minute, which may be obtained with an expenditure of from $\frac{1}{8}$ to 1 pound of solid fuel. That the fertilizing value from this fuel should be equivalent to the supply per ton of fuel of the equivalent of the nitrogen to that contained in 22 pounds to 28 pounds or more of ammonia sulphate. At present these conditions cannot be economically obtained from any other form of motor-generating procedure or plant than a gas engine. The procedure of the steam-engine method has an associated loss far greater than the gas engine; and although it is possible to convert the fuel into a gaseous condition and recover the nitrogen, there are losses attending the employment of such a procedure that partly neutralize the gain. It must be obvious to any one that direct and perfect combustion actually inside the walls of a motor cylinder must be more economic than the combustion, more or less perfect, in the flues of a steam boiler, even if effected under the most favorable conditions. Besides the fundamental advantages of the gas plant and gas-motor procedure, the instrument itself is more effective in its useful disposal of work represented by the indicated energy. Take the indicated energy of both the gas and the steam motor and compare it with that available for external work; it will be found that the former is very much more efficient. There is an important advantage in relatively small-power gas engines—the pulsations of piston effect could be so arranged that their effect on the supply would be unappreciable. In the arrangement of the plant for the projected coal field generating stations, gas motors of 300-horsepower are intended to be used, a pair of these engines being allotted to each alternating current machine, coupled direct, one engine driving the armature in one direction, and the other the field magnets in a contrary direction.

Electricity and Gas.

One often hears the statement that electricity for lighting purposes is making such headway that by it the use of gas is being displaced and less gas is being used. A careful study into the great strides made by the gas business since electric-lighting has been introduced will show that such is not true. Most of the large gas companies both here and in Europe have increased their plants materially during the past few years and continue to do so.

In Berlin, Germany, the central electric stations supply at least 100,000 lamps besides a large number of private installations; and notwithstanding this, the consumption of gas has steadily increased and the corporation of Berlin has recently decided to build another gas plant with a capacity of about 12,400,000 per day. In Leipzig and other German cities there has been a proportionate increase. For illustrations we do not need to go away from home. The gas companies in this and other large New England cities have all increased their plants.

If there was no such thing as electric-lighting, the consumption of gas would most likely be greater than it is, yet it is surprising how the introduction of electricity is always attended with an increased demand for gas. One of the principal reasons for this is the cultivation of the public taste up to a higher standard of illumination.

The electric light is so fine an illuminant, and with its use so much better results are obtained than with the use of old methods that the users of gas desire a higher candlepower and better gas and use more of it than they formerly did.—Boston Commercial Bulletin.

Useful Information.

A Change for the Better.

As old people fondly look back on the days of their youth, and say that such days were fraught with more of sensible and pleasurable living than is experienced by the rising generation, so do many of our veteran mechanics delude themselves by thinking that when they learned their trade, under conditions far more narrow and crude than those belonging to the advancement and greater enlightenment of the present day, men who followed mechanical vocations were better off and had more promising opportunities than they now do. No doubt there is a good deal to make such reasoning appear plausible. Thirty or forty years ago small machine shops were scattered thickly throughout the country, and many a mechanic, on a contracted scale, conducted an independent business for himself. Every town and village in the country had one or more clever individuals who, with the few rude tools and appliances of the times, did the "tinkering" for their neighbors. There was a deal of mechanical work done by hand, and to the old stagers it seems as if men then obtained employment more generally than than in these days, in which labor-saving machinery has such extensive usage. But if they stop to think, they would perceive that as many, if not more, individuals in proportion to the number of inhabitants, are at the present time engaged in mechanical pursuits. There has been a concentration of labor, that is all. The small shops have disappeared, but large establishments, containing new and improved machinery of all kinds, requiring for its guidance many hands, have supplanted them, and surpassed them to an immense extent in amount of work performed. It may be said, to roughly illustrate, that men now work in gangs and under a system of concentration, whereas formerly labor was more generally diffused among individuals who worked independently of each other.—Machinery.

Repairing a Broken Steamship Shaft.

The news that the Cunard steamer "Umbria" was drifting in midocean during a raging winter storm while the engineer made repairs on a broken shaft brought great relief to those who had friends on board the delayed vessel, but aroused a vast deal of curiosity among engineers everywhere as to how a broken shaft could be mended with the tools and material available on board the ship. Probably some 15,000 h. p. is transmitted from the "Umbria's" engines to her propeller by means of the shaft. To repair a break in this great cylinder, which is some 26 ins. in diameter, in such a manner as to enable it to transmit a small part even of the engine's power would appear to be practically impossible. A torsional strain which snaps a section of solid metal nearly 4 sq. ft. in area is not to be controlled by any weak makeshift.

The solution of the puzzle was not known until the "Umbria" herself arrived in port. It appeared that the fracture took place in the thrust-bearing between two of the flanges. The irregular running attracted the attention of the engineer, who stopped the engines, took off the thrust-bearing cap and found that a break had occurred extending about three-fourths through the shaft. The opposite flanges, between which the break occurred, were cut into and grooves were made in which heavy bolts were placed and held by straps passing around the shaft. Published accounts give the diameter of the bolts as 6 ins. By this expedient a coupling was made of sufficient strength to transmit the power from the engines to the screw when running at a 6 to 10 knot speed.

THE first paper of which mention is made was manufactured from papyrus in Alexandria, and was used by the nations living upon the shores of the Mediterranean. The art of making paper from fibrous matter reduced to a pulp in water is supposed to have been discovered by the Chinese about 1800 years ago. The Saracens, it is thought, acquired the art of making cotton paper about the year 704. The oldest manuscript written upon paper of this kind is in the Bodleian collection of the British Museum, and bears date 1409. In 1085, paper was made of rags instead of raw cotton. A specimen of linen paper is found bearing date 1100. In 1390, a papermill was established at Nuremberg by Ulman Stromer, operated by two rollers which set 18 stampers in motion. The first papermill in America was established by Wm. Rittinghuyzen and Wm. Bradford, on a small stream called Paper Mill Run, near Philadelphia; the second in 1710, at Germantown,

Pa. In 1729 a papermill was built upon Chester creek, Pa. The first papermill in Massachusetts was built at Milton in 1730. At the beginning of the Revolution there were three small mills in Massachusetts and one in Rhode Island. Now, large quantities of paper are made in this country and exported to England, Ireland, Australia, Mexico and the West Indies.

CAST-IRON COLUMNS.—In connection with the growing disfavor with which cast-iron columns are regarded in buildings, it is remarked that if pattern-makers, molders and founders were more careful, the number of failures of cast-iron columns might be greatly reduced. A molding may weaken a cast column by drawing away metal from the interior or shell proper. Sometimes a molding had better be cast separately and bolted on. Experiments made some time ago in Germany may be recalled, where two columns, one of cast and the other of wrought-iron, were equally loaded and subjected to a temperature first of 300 degrees Centigrade, then of 600 degrees, while streams of water were played upon them. It was found that the cast-iron pillars were much damaged and cracked, but did not fail, while those of wrought-iron were bent before a red heat was reached, and were so twisted when cold water was poured on them that they failed.—American Manufacturer.

POWER TRANSMISSION SCHEME.—A great electric power transmission scheme is being discussed in England. Mr. B. H. Thwait, the originator of the scheme, proposes to burn coal at the pit's mouth for the generation of power, and transmit this power electrically to the principal cities and manufacturing centers of England. The power would be generated by gas engines consuming only $\frac{1}{2}$ to 1 lb. of coal per horsepower-hour, and the residual products of the coal would all be saved and shipped by short haul to the agricultural districts, where they find their chief use as fertilizers. The cost of small installations of motive power (below 20 H.P.) in London is said to be from \$50 to \$90 per horsepower per annum. Mr. Thwait claims that electrical energy can be generated in the South Yorkshire coal fields and transmitted to London, a distance of 100 miles, at a cost of only \$22 to \$25 per horsepower for 3000 working hours per annum.

TIME TABLE FOR 1893.—Here is a time table for 1893:—Lent begins February 15 and ends with Easter Sunday, April 2; Washington's birthday, February 22, is on Wednesday; inauguration of the President, Saturday, March 4; St. Patrick's day, March 17, Friday; Fourth of July, Tuesday; Labor day, Monday, September 4; Christmas, December 25, Monday. It will be seen that Mr. Cleveland will have a chance to rest Sunday, March 5, and then to begin bright and early Monday morning to "set things to rights."

CATS, according to the old tradition, have nine lives, but they are not the only creatures that enjoy such a plurality. Infusoria have been dried and restored to life by moistening, after remaining inert dust for 27 years, and the drying and resuscitation have been successfully tried eleven times on one lot of rotifers. Frogs and many fishes suffer no injury from freezing solid, while, in a few cases, even warm-blooded animals have been restored to life after apparent death from freezing.

ALUMINIUM.—"Sebrof," in a recent number of *Engineering*, states that there is ten times more aluminium in the world than there is iron, lead, copper, zinc, nickel, gold and silver combined. He furthermore states that Dr. Meyer, of Berlin, has discovered a process by which the metal can be produced at about four cents per pound; (in 1828 the price was \$5000 per pound) the price to-day is about \$1 per pound.

ALUMINIUM SLATE PENCILS.—A new use of "the metal of the future" is announced, a German company having recently been started to make aluminium slate-pencils. The writing is stated to be as clear as with an ordinary slate-pencil and to be as easily erased. A Major von Sillich is said to have first discovered that aluminium makes a stroke on a slate.

EVERY oyster has a mouth, a heart, a liver, a stomach, besides many curiously devised little intestines and other organs, necessary organs such as would be handy to a living, moving, intelligent creature. The mouth is at the end of the shell, near the hinge, and adjoining the toothed portion of the oyster's pearly covering.

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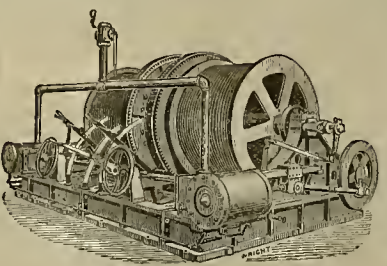
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Use of Accumulators.

In spite of the obstacles that have beset the path of the accumulator, this much maligned piece of apparatus has gradually advanced until, on the other side of the water at least, it holds a most useful position, not only as an adjunct in the central station, but in other lines as well. In this country, however, litigation has been the chief cause of backwardness, and the accumulator has not been given the same opportunity to prove its usefulness. At the present time, however, the tangle made by the lawyers is gradually being cleared away, and it is fair to presume it will not be long before some of the manufacturers will feel that their positions on patent matters will admit of an aggressive campaign to convince American electricians that they are losers by their failure to make a greater use of the storage cell. When the time comes, doubtless we will be able to see that, despite our claims about the great progress that has been made on this side of the water, we are decidedly behind the times. At least such will be the reader's impression after a perusal of the opinions of the London *Electrical Engineer* on the "Specialization of Accumulators."

Our contemporary feels itself to be in a position to point out that the time is rapidly coming when it will be considered "as loose to speak about or specify an 'accumulator' as it is to specify a 'dynamo.'" To-day, in drawing up specifications for a dynamo, the requirements of a situation are accurately determined, and the dynamo is specified and made—direct or alternating, shunt or compound or overcompounded, with light fields or heavy fields, large airgap or small airgap—according to the conditions for which it is required. "The same specialization of the accumulator has not yet been achieved," says the London *Engineer*, "but it must come."

There seems to be no question but that our contemporary is right in the opinion expressed above. Our foreign cousins make use of the storage battery in a way that leaves no doubt that they at least appreciate its value. And the fact that in England the time is rapidly approaching when the "specialization" of the accumulator will be deemed an advisable procedure on the part of the manufacturers, may be looked upon as a most encouraging sign. The time will come on this side as well, as on the other, when this step of specialization will be a necessity. We have experienced already, like the English, a demand for several types of cells, each specially suited to a particular class of work. The call for portable work is one thing; the call for traction work is another.

We concur, therefore, says the *Western Electrician*, most heartily in the opinion expressed in the article referred to, that "greater attention to this point must prove of advantage to the industry at large."

An Unsolved Problem.

Since in obtaining power from fuel by means of steam engines upward of 90 per cent is wasted, according to Prof. Elihu Thompson, in unused heat, while the power obtainable for use represents scarcely more than 10 per cent of the real value of the fuel under the very best conditions, the question arises whether there may not be discoverable a plan whereby a much larger percent age of the real value of the fuel may be turned to account as electricity, and through the latter as heat, light or power.

This question has at present no answer. The subject has been alive in the minds of our most able engineers and inventors for years, and some have striven hard to find a solution to the problem. Records of scientific discovery have been earnestly ransacked to find some clue, or, as it were, a guiding post to point the way for the uncertain explorer. It now appears that we may be compelled to wait some new discovery, some new adaptation, or some new generalization before the way to the much-desired solution may be found. The effect on the general industrial and economical development in electricity which would follow the discovery of some, not too complex, means for realizing an economy of even 40 or 50 per cent of the energy value of fuel is indeed incalculable.

Then truly would electricity become the almost universal agent in the production as well as the transmission of power. The steam engine would go out of use almost entirely. We should burn our coal not under steam boilers; it would be consumed in electric generators. Our steamships would have their machinery replaced by such genera-

tion, and their propeller would be turned by gigantic electric motors connected with the generators. The speed would be increased so as to still further shorten the time of an ocean voyage. The uses of electricity as a heating agent would be vastly extended, and it goes without saying that our lighting would be accomplished at a much less cost. *Manufacturers' Gazette.*

Electrical Railway Mail Tube.

The postoffice department at Washington has decided to make a practical test on an electrical railway mail tube for transporting mail between New York City and Brooklyn. This railroad is the invention of Mr. A. Bryson, and is operated by the Automatic Dispatch Company, of which G. Mudge is president and Oscar Wheeler secretary. The system contains a miniature trolley line inclosed in a 16-inch square conduit. The mail matter will be placed in carriers of steel wire four feet long and 14 inches square, each pouch containing 3000 letters or an equal bulk of other mail matter. A small electric motor at the end of each gives the car motive-power, and the current is obtained from a wire running between the track. It is said that these cars will run at a speed of 75 miles an hour. Their operation is automatic, so that at either end the clerks will merely need to load and start them. The conduits in which it is proposed to operate the trolley-car are suspended to the framework of the Brooklyn bridge and the elevated road on Adams street in Brooklyn. The frame for the New York end has not yet been determined on. The postmasters of both cities are thoroughly convinced of the practicability of the proposed scheme. Mr. Thos. McGilligot, general manager of the Automatic Dispatch Company, expects to begin work as soon as the bridge trustees have given their consent to the use of the bridge.

As it is at present, the mail traffic between the two cities is badly congested and the New York office daily sends to Brooklyn on an average 55,000 letters and 30,000 circulars and packages, besides many extra pieces from outside points which are rehandled and transferred. The work is at present accomplished by wagons leaving the office every hour, and there are many hours during the day when the trip is made slow and uncertain by frequent blockades and vehicles.—*St. R. R. Gazette.*

The Alternating Current Ampere.

Referring to the definition of the alternating current ampere in the report of the committee of the Board of Trade on electrical standards, *Engineering* says:

"The definition of the strength of an alternating current is made to depend on the square root of the time average of the square of its strength at each instant of its period, which is not, it must be confessed, readily intelligible, but it may, perhaps, be put as follows: The amperage of an alternating current is equal to that of a constant current, when the heating effects of the two currents passing through equivalent resistances are the same. If the resistance is constant and noninductive, the heating effect measures the whole energy expended and is proportional to the square of the current, and when the latter is constant is very easily calculated. If the current is alternating we may divide its period into a convenient number of small parts and consider the current as having a constant but different value throughout each of these parts. If we add all these strengths together and divide by the number of parts, we shall get a mean value of the current, which, however, will prove to be zero if taken through a complete period, as, for each value of current in one direction, there will be an equal value of current in the opposite direction, and taking note of this difference in sign, the average current will be zero. If, however, we regard the heating effect, we shall obtain this by adding together the squares of all the values of the current throughout its period. Dividing this by the number of values, we shall have the mean value of the square of the current, and the square root of this will be equal to the strength of a constant current having the same heating effect. This process is, in short, that of finding the square root of the time average of the square of its strength at each instant of its period."

EFFECT OF ELECTRIC LIGHT ON PLANTS. At a recent meeting of the Manchester association of Engineers, Mr. B. H. Thwaite, referring to the effect of electric light in accelerating the action of plant life, showed the leaves of the *Acacia cophanta*, which were closed while in darkness, when removed into the brilliant beam of the arc light, opened almost magically, the leaves nearest the root being the first to be influenced.

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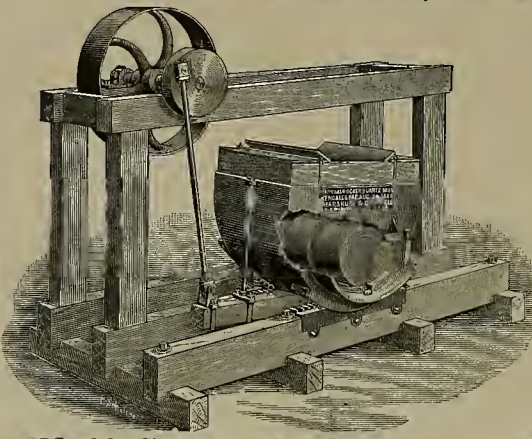
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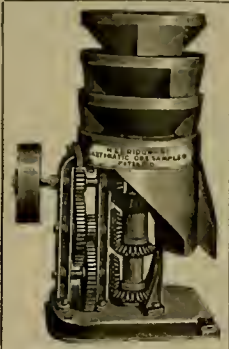
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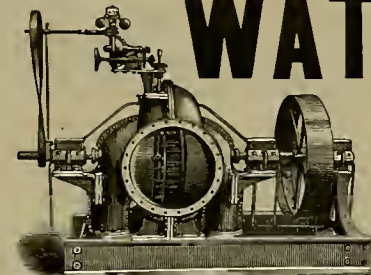
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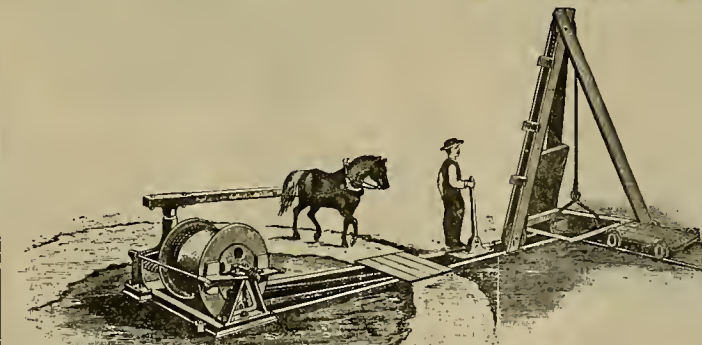
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The Local Coal Trade.

The condition of the coal market and statistics covering the 12 months ending December 31, 1892, as compiled by J. W. Harrison, is as follows:

The consumption of coal during the past year, as compared with the preceding 12 months, shows an apparent falling off of about 300,000 tons, but it must be remembered that dealers commenced this year with excessive stocks in yard, and the statistics of receipts do not include the San Pedro and San Diego importations, which in 1891 amounted to about 161,000 tons. Low prices have ruled throughout the year; in fact, the average quotations have been the lowest known.

Under ordinary circumstances, the very low prices of fuel should have made our manufacturing interests very profitable, but, unfortunately, general business in that line has been below the average. The importers of foreign grades have been the principal sufferers, as there have been losses made on every cargo which has arrived here unsold, notwithstanding charters have been effected at exceptionally low figures from Great Britain and Australia. The market is now recovering somewhat, with every evidence of further strengthening. As this is not a very seductive port for vessels to seek with the present low charter rates for grain, the prospects for any early improvement seems somewhat remote.

The following table of prices will show the monthly fluctuations of foreign coals for "spot" cargoes, the average price being given for each month:

NAME.	Jan.	Feb.	March	April	May	June
Australian (gas).....	\$6.50	\$6.25	\$6.25	\$6.00	\$5.87	\$5.75
English steam.....	6.25	6.25	6.25	6.00	5.87	5.75
Scotch Splint.....	7.00	6.75	6.75	6.50	6.25	6.00
West Hartley.....	7.00	6.75	6.75	6.50	6.25	6.00

NAME.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Australian (gas).....	\$5.75	\$5.87	\$5.87	\$5.12	\$5.25	\$5.37
English steam.....	5.75	5.87	5.87	5.12	5.25	5.37
Scotch Splint.....	6.00	6.25	6.25	6.50	6.75	7.00
West Hartley.....	6.00	6.25	6.25	6.50	6.75	7.00

The various sources from which supplies have been received during the year are as follows:

	1891.	1892.
British Columbia.....	652,457	471,540
Australia.....	321,197	240,940
English and Welsh.....	188,888	201,460
Scotch.....	31,840	20,930
Eastern (Cumberland and Anthracite).....	42,210	34,120
Franklin, Green River and Cedar River.....	178,230	159,850
Carson Hill and South Prairie.....	156,750	202,320
Mount Diablo and Coos Bay.....	50,684	68,140
Japan, etc.....	20,679	4,960
Totals.....	1,702,833	1,402,290

The above figures show a marked falling off in the imports from British Columbia during the past year. The low prices ruling caused a partial suspension of shipments, as they were unable to profitably compete with the prices paid for Australian, Cardiff and Swansea cargoes. The consumption of these two latter grades has very largely increased, they having become very popular with some of the heaviest consumers, who have tested them for the first time this year.

Importers are not so solicitous to make contracts for future delivery as in former years unless they are paid full figures, mainly because this year's experience is very fresh in their memory, and they are less liable to hazard shipments, unless sales are made prior to loading.

Coke—The arrival of foreign coke during the past year was 19,910 tons, being less than one-half the quantity imported (40,974 tons) in 1891.

ALASKA PLACERS.—John P. Lindsay, an Alaska post trader, pilot, salmon canner, etc., is here on a business visit. Mr. Lindsay lives at Chilkat, about 150 miles to the north of Juneau and the same distances from Sitka, where he carries on his various occupations with his partner, John Dalton, the deputy United States Marshal, an old Arizona pioneer and a native of Texas. He says: "When I return I shall take with me a cargo of supplies and an outfit and horses for a big pack train which we intend to establish in the spring. This will be a great thing for the country in the far interior the country along the Yukon to the mines being the principal places benefited. Of course, we are not doing this wholly to benefit those places or entirely for our health. There is a lot of money in it. At present the miners have to do their transportation by boats or rafts on the Yukon. At White Horse rapids they have to land their rafts, pack the goods over the ranges and build another raft to proceed on the journey when they set around to the river again. The Indians do the packing on their backs over the ranges, which costs \$40 for a hundred pounds. Our pack-train will carry from

Chilkat to Mixkaheer, a distance of 250 miles, to a point beyond the rapids. Rafts will then complete the journey to the mines, a total distance of 600 miles. I shall take a lot of horses up with me. There are only five there at present, and they are the pioneers of Alaska, having been taken there by Elades and Dalton, and used in their explorations of the country as far as Mount St. Elias."

Carson Valley Ranchers and Millmen

The *Appeal* says the long and needless war between the Carson Valley ranchers and the Carson river men stands in a fair way of being settled. The proposed basis of compromise is as follows:

The Mill Company and the ranchers are to enter into a stipulation that the mills take a decree for 6,000 inches of water from September 15 each year to June 15 of the following year, and for 5,000 inches from June 15 to July 15 of each year, the ranchers to have all the balance of the water flowing in the river, and from July 15 to September 15 of each year the ranchers to have all of the water flowing naturally in the river, the water to be measured at Cradlebaugh's bridge in a box or gate to be constructed under the joint supervision of the ranchers and millmen. It is understood that 6,000 inches is about the quantity of water that will fill the Mexican ditch at Empire. The ranchers are to have sufficient water for domestic purposes and for watering stock at all seasons of the year without regard to the quantity in the river.

It is believed the mill companies will accept the compromise.

An electric railway system without overhead wires or underground conduits has been brought out by Mr. Wynne, late manager of the Brush Electric Light Co., of London. The main principle of the system is the use of charged sectional contact rails covered by the moving car. These are laid in the roadway parallel to the ordinary track, and successively charged from an underground insulated conductor, but only those contact rails are electrically charged which are actually under or so close to the moving car as to absolutely protect the ordinary traffic of the streets from the possibility of contact with the electricity. The chief engineer of the Electric Construction Co. is said to guarantee the efficient working of a line laid on Mr. Wynne's system.

IDAHO'S OUTPUT.—The Boise National bank for Wells, Fargo & Co. has collected the statistics for Idaho for the year just closed. The figures are as follows: Gold, 1,790,000; silver, \$2,798,000; lead \$2,475,000; total, \$7,063,000. In 1891 the production was: Gold, \$31,500,000; silver, \$565,000; lead, \$4,200,000; copper, \$75,000; total, \$8,996,000, a decrease in the production of \$6,017,000. The decrease was due principally to the fact that many mines are shut down owing to the low price of silver. The Cœur d'Alene strike also caused a decrease in the production. A statement has been prepared showing that it cost the state \$214,159 to suppress the strike in the Cœur d'Alenes.

COAL IN MEXICO.—A vast bed of lignite coal has been discovered but a short distance from the seacoast, a few miles north of Guaymas, Mexico. Senor A. Artigues, who has recently arrived from the scene of the discovery, claims that the coal possesses superior burning qualities for household purposes. A company of Arizona capitalists have organized to operate the mines. It is proposed to ship several hundred tons of the newly-found article to San Diego and Los Angeles to have its qualities thoroughly tested there.

RAILROAD TO ASPHALTO.—The Southern Pacific Company's branch line of railroad, extended from Bakersfield to Asphalto, is finished and will begin operations on the 18th of this month. As there is very little traffic, there will only be one train, which will run three times a week. Asphalto is a small settlement at the asphalt mines, and asphaltum will be the principal freight taken over the new branch line.

HYDRAULIC MINING IN NEVADA.—A carload of twelve-inch iron pipe arrived at Golconda yesterday for Judge Bonfield's placer mines south of that place. It is to be used in bringing water to the placers for use in hydraulic mining.—Silver State, January 9th.

MINING assessments falling delinquent in January amounted to \$280,700, of which Nevada mines want \$270,000 and California mines \$10,000.

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GERMAN SAVINGS AND LOAN SOCIETY CALIFORNIA Street. For the half year ending Dec. 31, 1892, a dividend has been declared at the rate of five and one-tenth (51-10 per cent per annum on Term Deposits, and four and one-quarter (4 1-4 per cent per annum on Ordinary Deposits, payable on and after Tuesday, Jan. 3, 1893.

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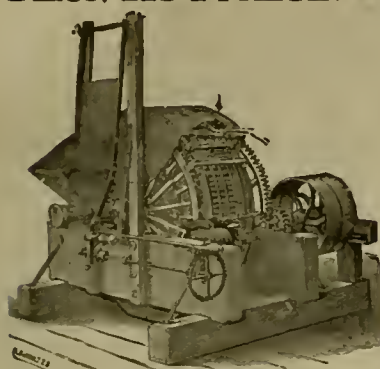
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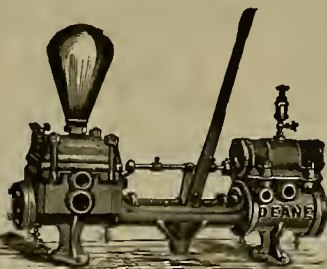
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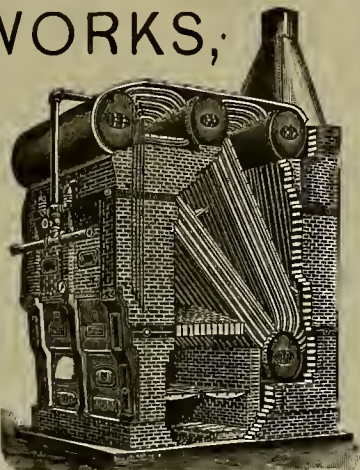
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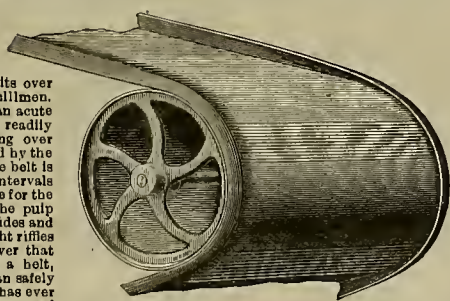
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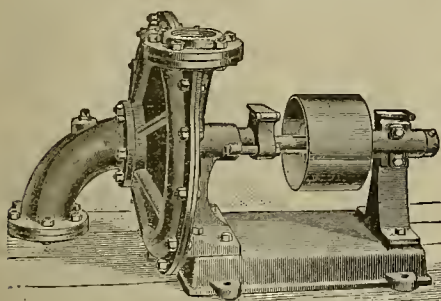
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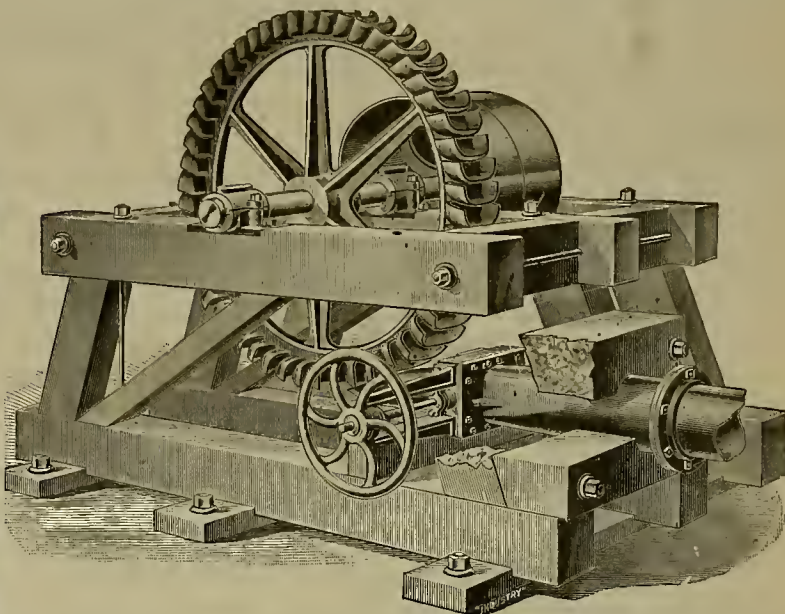
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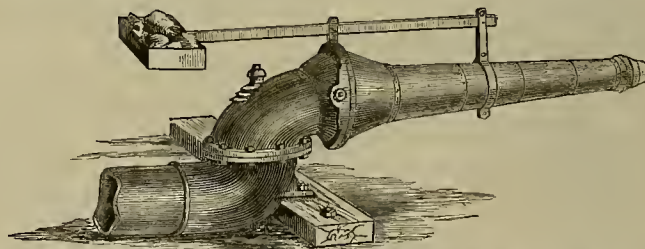
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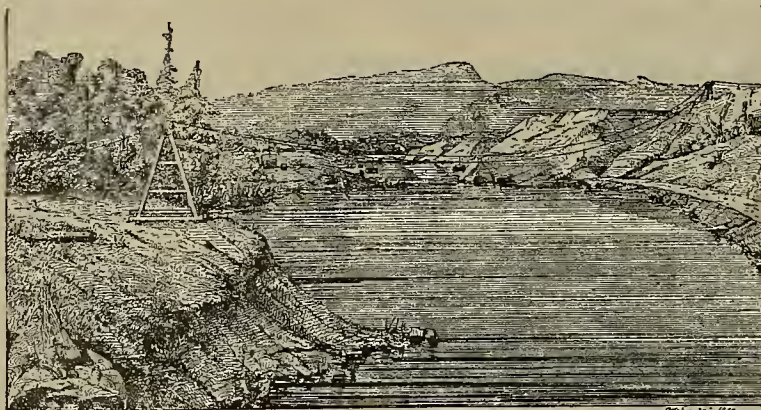
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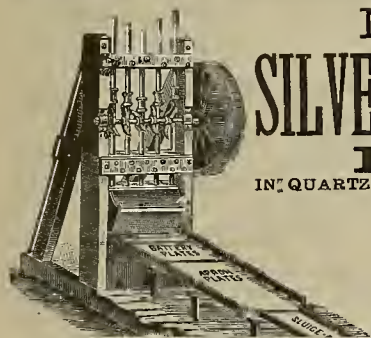
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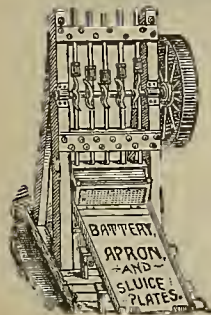
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BAY STATE.—Amador Record, Jan. 12: Superintendent Jones of the Bay State mine at Plymouth telegraphed from San Francisco on Saturday last to turn on the water which supplies the mine with power. The Talisman mine, part of the South Spring Hill property, is being bothered somewhat lately with excess of water. The South Spring Hill is, however, looking well in all its parts and turning out the usual amount of bullion. Norman Wheeler, of Plymouth, was in Sutter Creek on Tuesday and visited the Record office. Mr. Wheeler is of the firm of Wheeler, Wild Bros., owners of the Wheeler mine. He reports that the mine is looking fine. They have a shaft sunk 60 feet in a granite formation. At the bottom of the shaft the ledge is six feet in width, which averages on a thorough test of 116 tons over \$5 per ton in free gold; the sulphurets were not valuable. Experienced men think that as the shaft goes deeper and they get below the water level, the ore will improve in value and sulphurets will prove an important item in the output. They are now erecting a live-stamp mill on the property, which is being manufactured by Knight & Co. of Sutter Creek. The machinery is expected to be finished by them this week. Mr. Wheeler hauled a portion of it Tuesday. They are grading and framing the timbers so that when the machinery is all delivered it will take but a short time to erect the mill. It is expected to have the mill in running order not later than the 15th of next month.

TUNNEL.—Amador Ledger, Jan. 14: Contractors Dwyer & Hurley, who have been running a tunnel 150 feet on the Farrell property for the owners, Wise & Seligman, have completed the contract and are now cross-cutting. The water has been lowered in the Hector to the 800-foot level, and in a short time they expect to see the bottom of the shaft a the 1000 foot level, as there are no large openings between those levels. The Kennedy mine made the largest clean-up for December that ever was made in the history of that property. It amounted to \$68,000. At the same rate for the year the mine will have returned the neat sum of \$816,000. At the Wildman, sinking is progressing very rapidly. They are not troubled much with water, and are advancing about 20 feet a week. They are below 900 feet and are going to the 1000-foot, when they will cut stations and resume operations at the mill. The South Eureka are now hulkheading the water on the 500-foot level preparatory to resuming sinking. The hulkhead will be made of three walls of 16-inch timbers set in concrete, the hulkhead being arranged with air and water valves, so that at any time the water can be drawn off. The Newton brothers of Woodbridge have been having some prospecting done on Joe Mason's ranch. The Cox brothers have been doing the work by contract and have struck a ledge of good-paying rock, so they claim. The investigators of the prospect came up Monday to visit the property and arrange for further developments.

Butte.

THE ARMSTRONG MINE.—Oroville Mercury, Jan. 14: In conversation with A. T. Graner, the Mercury learns of important quartz developments at Oregon gulch. The old Armstrong mine, recently sold by himself and L. Lester to Woodland parties, is being developed with every indication of permanency. Some ten or twelve men are at work driving a tunnel in on the lode, and the owners expect to largely increase the force in a short while. Mr. Graner will go to Woodland on Monday to confer with the owners of the mine. If developments are according to expectations, a mill will shortly be erected.

Calaveras.

MILL STARTED.—Calaveras Prospect, Jan. 14: The mill at the Herold mine, near Big Bar, formerly known as the Leavitt mine, was started up last Monday, and operations are being pushed ahead in a lively manner. The mine has been worked by a tunnel following the lead for over 800 feet, and out of which a sufficient amount of ore was taken to keep the mill running for a year to come. The ore is free-milling, easily taken out, and will pay from \$5 to \$10 a ton without the sulphurets, which run from \$1 to \$500 a ton, or averaging \$100 per ton. A Huntington mill is used at present, but it is the intention of the company to put up a ten-stamp mill in the spring.

Mono.

GOLD CAMANT.—Lundv Index, Jan. 14: Yesterday an Indian showed us a pound or so of the rich gold cement so much talked about 35 years ago. It was the genuine stuff, and plumb full of glistening, yellow metal. He was going to Bodie to sell it to Soderling for "fifty" dollars. Every winter the Indians get this wonderfully rich stuff somewhere in this region. The locality of the deposit cannot be many miles away. Legend places it in a deep canyon on the eastern slope of the Sierras, within Mono county, and not far from the summit. It is sure that the Indians know where it is, but they won't divulge the secret.

Nevada.

A PECULIAR CLAY.—Nevada Transcript, Jan. 16: Sam Casper of Truckee, who is at present in this city, brought down with him a sample lot of clay taken from McGlashan's tunnel, near Truckee. He left some of the peculiar-looking substance at the Transcript office, and we have tried it for washing hands and pronounced it an excellent detergent. It looks very

much like the sediment which forms in reservoirs or lakes, and is evidently a sediment deposited from some ancient river or lake, as the layers can be plainly seen. The clay is impalpably fine, there not being any perceptible grit to it, and water readily softens and dissolves it. The deposit is owned by Truckee men. C. F. McGlashan being at the head of the company. It is proposed to incorporate and work the claim, with a view of putting the clay into proper form for sale in the market, both as a toilet and household article.

Napa.

QUICKSILVER.—Calistogan, Jan. 9: During December, 1892, quicksilver from the mines was shipped from Calistoga as follows: Mirabel, 464; Great Western, 412; Sulphur Bank, 113. Total for month, 989.

Placer.

GOLD NEAR SAGE HILL.—Placer Argus, Jan. 14: Considerable excitement was caused at Michigan Bluff, on Monday, when the report reached town that Henry Scheimer, formerly superintendent of the Golden Fleece mine, but who is now working his own mine near Sage Hill, had struck a bonanza in the shape of a large number of "chunks," some of which weighed as high as \$30. The report is that there are plenty more left. Oscar Baggs, one of our young mining experts, went to Last Chance to find the ledge. The rock prospects \$3000 per ton. Mr. Baggs has not returned yet.

Shasta.

HIDDEN TREASURE.—Shasta Courier, Jan. 14: One of the owners of the Hidden Treasure, at Iron mountain, was here this week. Prospects are not as favorable as last week, but they intend to push the tunnel in 100 feet on the ledge, as the mine has produced some very rich ore, and the owners hope that further developments will reveal something permanent. The Levi, or Minnesota, mine below the Hidden Treasure and situated on Spring creek, about five miles from Shasta, promises to develop into a regular bonanza. The ledge has widened out to seven feet and it is all pay rock. The property is owned by Chicago men. They use the Parmelee dry process, and the mill, which has a capacity of about 14 tons, will not start up until next summer, probably. Simoni and Xavier are running a crosscut on their Lower Springs property. George Leivys and John Lord have located a ledge on Kanaka gulch, west of Shasta, that promises well, and we hope the boys will realize a fortune out of the property. Paige and Drury struck some exceedingly rich rock in the tunnel a few days ago. Jim Dawe, who has been down here working his mine this winter, went up to Squaw creek, where he and ten others own a big ledge that promises to develop into a bonanza. A. M. Brewer showed us some gold this week taken from the mine owned by himself and Palmer, adjoining Wm. Crum's mine, the Pacific, and is confident that they will soon strike a pocket. The vicinity of Shasta is fairly teeming with prospectors and placer miners, and there is not an unoccupied cabin within a radius of five miles of Shasta.

Siskiyou.

BLUE GRAVEL.—Yreka Journal, Jan. 18: Murray & Co., who have been sinking a shaft at Greenhorn, about half a mile south of the Lee, Lash & Co. claim, to strike blue gravel, have put in a new steam-engine and pump, so as to keep the claim drained in sinking down. They have reached a depth of over 50 feet, and feel confident of striking the same kind of rich blue gravel found by Lee, Lash & Co. Lee, Lash & Co. received their new pump last Friday, and will soon resume operations, having been obliged to suspend work on account of their old pump being no good. The Ashland Tidings says the Crowsons, father and son, and T. T. Hills, of that place, and Pearson Bros., of Cottage Grove, who have mining properties adjacent over in Siskiyou county, near the Anderson ferry, have consolidated their interests and formed the Pearson Mining Company, which was organized in Ashland last Tuesday, with George Crowson as president, T. E. Hills, secretary and treasurer, and George W. Crowson general manager. The Pearsons have a four-stamp mill at their mine, which will be kept running at present, and the new company has bought the Jacobs five-stamp mill at Henley, and will move it to a point on Klamath river above the ferry and near the mines. Geo. W. Crowson went over to the mines last Friday.

Sonoma.

CINNABAR KING.—Sonoma Tribune, Jan. 12: Recent developments at the Cinnabar King mine, in the Pine Flat belt, are reassuring of the great worth of the ledge. Ed. White, the superintendent of the mine, was in Healdsburg the other day and brought with him some fine specimens of ore. He is confident that wealth is in store for the owners. The vein's depth is far greater than what was anticipated, and its thickness is nearly uniformly 40 feet. There is little doubt now that a furnace and smelter will be purchased by the company soon, and that the mine will be extensively operated.

Trinity.

NEW RIVER.—Blue Lake Advocate, Jan. 10: Mr. George Dean left Blue Lake recently en route to New River. Mr. Dean came down three or four weeks ago, and is going up on a brief visit. He is present superintendent of the Ridgeway mine and the pioneer miner there. New River camp is about a hundred miles from Korbel, 40 miles east of Trinidad, and has an approximate altitude of 5500 feet. The first snow is liable to fall in October, but sometimes does not come until November. It usually is gone before the close of April, though not seldom it lies on the ground until June. The journey to New River is usually accom-

plished on muleback over trails. Residents of that section expect to have highways some day. Just now a wagonroad is in course of construction from Etna to Sawyers Bar, which is expected to afford some relief. "The roughest job I ever undertook, however," remarked Mr. Dean, "was the transportation of two mortars and a rock-breaker from the north fork of Trinity to New River. We hauled them over mountains and across gulches where, so far as appearances went, the foot of man had never trod, and along precipices frightful enough to make even a Blondin turn pale. It cost us \$1800 to haul them 40 miles. I was glad when it was all over." Mr. Dean has unbounded faith in the future of New River. The mines there, he says, are passing through the successive experiences of all paying mining properties, and that there are quantities of gold in the New River claims he now doubts. The placer mines on Pony creek, he suspects, have been pretty well worked out, but he says there is good mining property on both forks of the Salmon. Work on the Ridgeway mine will go on, and, considering the depth reached, encouraging developments will be in the near future expected. The distance from the top of the shaft, or tunnel, to the bottom is 400 feet, the first 217 feet being on an incline and the last 183 feet perpendicular.

ENTRAPPAISA.—Trinity Journal, Jan. 14: J. L. Day informs us that the Enterprise mine, in the East Fork district, is looking very well. This week a foot ledge of good rock was struck in the Enterprise, and a 4-foot ledge of milling ore in the Lone Jack. There are over 100 tons of rich rock in sight. The 10-stamp mill belonging to the company was started up Thursday and will run night and day. The Enterprise has been the best paying mine in the district and we are glad to hear of the new strike. C. C. Shattuck was in town from Canyon creek this week and informs us that he has struck the ledge in the Buck Ranch mine, for which he has been running a tunnel the past season. The ledge where cut is five feet wide and of good quality of ore. An upraise will be run to the upper tunnel and when this is completed a good deal of ore can be taken out. It will take about 60 days to run the upraise. There are two Huntington mills on this property which have a capacity of about 20 tons a day. Jas. Mullane was in town this week on land business, and informs us that the outlook for New River for the next season is most encouraging; in fact, he considers the prospects of the camp as good as they ever were. Quite a sum of money has already come out of New River and at this time it can hardly be said that enough development work has been done to thoroughly determine the character of the mines. The people of this county have always had a good deal of faith in the permanency of that camp. Wm. Vollmers was in from Trinity Center this week, and informs us that work on the Cinnabar mines has been shut down for the winter, but it is expected work will be resumed in the spring on a larger scale than ever. There is no question but that Cinnabar contains one of the largest and most valuable deposits of quicksilver in the State. The two principal companies are the Altona and Integral. If litigation ceases, the camp will progress with giant strides the coming season.

Tuolumne.

POCKETS.—Sonoma Democrat, Jan. 14: Charles Saunders and Charles Penrose, who are working a pocket claim on the Batten ranch, have within the past two weeks taken out over \$1000 worth of gold. The prospects for a larger find are very encouraging. Quite a number of strikes have taken place lately in our pocket mines. The lucky finders are not saying much, yet it is well-nigh impossible for a pocket-miner to conceal his good luck.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Virginia Chronicle, Jan. 14: 1500 level.—We continue running water through the old east crosscut from the south drift, 30 feet south from the shaft station, which has reached the old slope timbers, and is working down through them to the 1650 level. From the end of the main south drift, or the connection with our sill-floor stopes, we have completed filling with waste rock the openings connecting with the 1650 level. We are in full possession of the stopes on this level and have ventilating air passing through every part of it. Are repairing the ore chute and ladderway leading to the ninth floor. It will take five days to complete this work, and we will then resume ore extraction from this level. There is very little gas escaping through the Con. Va. shaft. 1600 level.—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connection with the 1500 level, north drift. 1650 level.—Have continued making necessary repairs to the drifts on the sill floors of this level. Have extracted from the old stopes, eight floors up in the upraise No. 6 carried up from the main northwest drift, and raised to the surface 124 tons of ore; average car assay value, \$30.72 per ton.

OPHIA.—1465 level.—The upraise started on the sill floor, on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground, 101 feet below the sill floor of this level, has been carried up 8 feet; total height, 74 feet, continuing in porphyry with quartz.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 20 feet; total length, 463 feet; continuing in porphyry and clay showing lines of quartz.

UNION CON.—900 level.—The joint Union C. n. and Sierra Nevada west drift has been extended

during the week 26 feet; total length west of joint shaft, 2821 feet. The face is in porphyry and streaks of clay.

UTAH.—340 level.—West crosscut No. 3 from the north drift from west crosscut No. 2, at a point 195 feet in from its mouth has been extended 12 feet; total length 76 feet. The face of this crosscut is in quartzite and clay formation, with eight inches of water flowing therefrom.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 32 feet; total length, 568 feet; face in soft porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 26 feet; total distance west of shaft 2821 feet; face in porphyry and streaks of quartz.

GOULD & COAR.—200 level.—During the past week, west crosscut No. 5, started 435 feet from main west drift, has been advanced 14 feet; total length, 242 feet; face in porphyry and stringers of quartz. All work has been discontinued in west crosscut No. 6. Sinto tunnel level. The joint north drift with Savage Co. has been advanced 24 feet; total length, 816 feet; face in porphyry.

BEST & BELCHER.—200 level.—All work on this level during the past week has been timbering and repairing. 900 level.—West crosscut No. 3 has been extended 20 feet through hard porphyry; total length, 69 feet.

EAST BEST & BELCHER AND NORTH GOULD & COAR.—Drifting is being continued, passing through quartz that looks well.

ANDES.—On the 420 level are retimbering and repairing main north drift. Resumed work in face of north drift run from east crosscut No. 1, north, and advanced the drift 12 feet; total, 31 feet; face all in quartz of very low assay value.

HALE & NOBACROSS.—We continue retimbering main shaft above the 600 level. Main Incline.—Are making the necessary repairs, and are retimbering incline above the 1800 level. 1800 level.—West crosscut No. 1 from the main south drift was advanced 25 feet; total length, 235 feet; face in porphyry with small bunches of quartz. No. 3 west crosscut from the main north drift was advanced 17 feet; total length, 235 feet; face in hard porphyry. West crosscut No. 4 from main north drift was advanced 20 feet; total length, 94 feet; face in porphyry with some small bunches of quartz.

CHOLLAR.—The north drift from the south line, 550 level, is out 95 feet; face in quartz and porphyry. Are repairing north compartment in the main shaft, 930 level. The north drift from the east crosscut, 160 feet south of north line, 930 level, is out 90 feet; face in porphyry and clay with streaks of quartz through it.

POROSI.—The south drift from top of raise, 1100 level, is out 22 feet; face in quartz that assays from \$30 to \$35. Are grading and enlarging the connection between the Potosi winze and the northwest drift, 1800 level Ward shaft. Extracted and sent to the mill the past week 372 tons and 1500 pounds of ore from the 550, 930, 1100 and 1150 levels. Milled during the week 380 tons; on hand at mill, 81 tons 550 pounds. Average battery assays, \$32.49. Average car sample assays, \$31.15.

WARD SHAFT.—There has been no work done on the 1800 level of the Alpha and Exchequer during the week. Have been engaged in placing pressure pipe in the shaft. The west crosscut from the northwest drift, 300 feet south of north line of Billion, 1800 level, is out 185 feet; face in low grade quartz and porphyry. Are grading and enlarging the connection between the Potosi winze and northwest drift, 1800 level.

OCCIDENTAL.—The main north drift, 750 level, has been extended 14 feet; total distance from No. 1 winze station, 590 feet; face continues in low-grade quartz. Have completed the station for No. 2 winze in south drift and have resumed working at that point. East crosscut No. 2 in Zadir drift, Sinto tunnel level, has been advanced 23 feet; total length, 143 feet. The face is in porphyry and quartz.

BULLION.—East crosscut, 160 feet north of top of raise, from east crosscut 320 feet south of north line, 1300 level, is out 47 feet; the face is in quartz and porphyry. The west crosscut from the northwest drift, 300 feet south of north line, 1800 level of Ward shaft, is out 185 feet; face in low-grade quartz and porphyry.

EXCHAUER.—There has been no work done on the 1800 level during the week. Have been engaged in placing pressure pipe in the Ward shaft.

ALPHA.—There has been no work done on the 1800 level during the week. Have been engaged in placing pressure pipe in the Ward shaft.

KENTUCK.—Work done in the mine from the 6th and 7th floors above the east crosscut on the 160 level. We are extracting 10 tons of ore per day of the average value of \$33 per ton, as per car sample.

NEW YORK.—The west crosscut, 55 feet north of shaft, 850 level, is out 77 feet. It has cut over 40 feet of quartz which occasionally shows spots of ore, but as a whole is low grade. We continue to extract 10 cars of ore per day from the 700 stopes, car samples averaging \$40. Shipped to Washoe mill the past week 165 tons 337 pounds of ore; milled during the week 165 tons 337 pounds of ore; on hand at mill, 60 tons; average battery assays, \$44.55; average car sample assays, \$42.33.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 6 feet; total length, 29 feet; the face is in hard porphyry.

WORK EXPANDING IN THE CON. CAL. & VA.—Enterprise, Jan. 13: Eighteen men were yesterday added to the working force of the Con. Virginia mine. That means an increase of \$72 a day in local earnings, and about \$2250 a month

added to the pay-roll. This is good work that everybody will be glad to see continued. Superintendent Lyman of the Con. Cal. & Va. writes to San Francisco under date of the 11th instant as follows: "I intend to go to the 1100 within a week or two and try to recover our air-pipe and track that we had to abandon at the time of the fire. We cannot work there at present, and in a very short time all the drifts will close from ground pressure. On the 1500 level the stope is cooling off gradually. During our abandonment of the 1500 stope the ore chute and gangway through which we send the ore from the stopes above and hoist timbers up, crushed and closed so that it will take five or six days to make necessary repairs to use them again. When this work is done we will resume ore extraction from that point." This is good news. The extraction of ore will gradually increase, and work in the mine be expanded until it employs as many men and puts as much money into circulation as it did prior to the gas troubles.

TWO HUNDRED DOLLAR ORE.—Robert Mahanny, an old and reliable miner, has made a valuable strike in the Apex claim on Mount Davidson. He has a tunnel which is in some distance in the mountain, and which has recently disclosed a ledge of rich ore. Assays from the ore made a few days ago yield \$200 a ton. The ledge of ore in the face is eight feet in width, and promises a mighty good thing for Mr. Mahanny. He will continue the development of his claim, and is highly sanguine of opening up a good mine.

A SEMI-LOCAL INDUSTRY.—The Dayton Dredging Company is a hard combination to down. It is about to renew operations on a new basis that is expected to bring better results than in the past. Mr. Rae, Jr., the superintendent of the dredge at Dayton, yesterday received a telegram from the secretary of the company at New York stating that the company is preparing to expend \$40,000 to change the machinery on the dredge and institute improved methods in the work. The new departure will be begun shortly. The Dredge Company has spent something like \$100,000 in its dredging enterprise. The money has come in from the outside, and the enterprise has therefore been a good thing for Dayton. There are millions of dollars in the bottom of the Carson river, and everybody who has watched the perseverance of the Dredging Company hopes it will get there eventually.

Cottonwood District.

NICKEL AND COBALT.—*New Era*, Jan. 14: The group of nickel and cobalt mines, owned by John D. Sullivan, in Cottonwood, is reported to be a very valuable property. Those who have examined the claims speak very highly of their worth. The district in which they are located, for three miles square, is said to be highly mineralized with nickel and cobalt.

Tuscarora District.

TWO RUNNING.—*Silver State*, Jan. 10: V. M. Nelson is back from Tuscarora. He is one of the many miners let out of employment in the camp by the closing down of mines. The Navajo and a gold mine, which is owned by W. J. Urton and others, are the only mines which have not closed down. About 25 men are employed in the former and 12 in the latter. Hard times prevail, and the outlook for the old camp is very gloomy.

NAVAJO.—*Tuscarora Times-Review*, Jan. 13: The stopes above the 350-foot level are looking about the same.

BELLE ISLE.—The stopes above the 250-foot level still show good ore making north.

NORTH BELLE ISLE.—The stopes above the north 300-foot level are yielding a little very good ore, as is also the stope above the south 400, No. 1. Have discontinued No. 3 stope.

Pioche District.

BULLIONVILLE.—*Pioche Record*, Jan. 12: The work of reducing the large tailing pits at Bullionville, by the Bullionville M. & R. Co., has about settled into a steady business, and the work is rapidly advancing and expanding. A successful run of the chloridizing furnace ended three days ago, when the whole cooling floor was piled high with tailings ready for the leaching tanks, which, with present tank capacity, it will take ten days yet to dispose of. The White & Howell roaster in which the chloridizing is done can easily put through from 40 to 45 tons a day, or more, the chlorinations running to 70 per cent and upward. The leaching is fully up to the chlorinations if time is given, but giving the necessary time curtails the capacity of the tanks, as now operated, and less than 20 tons a day can be disposed of. All modern appliances for the economical and rapid handling of the ore are provided, and the necessary repairs are reduced to a minimum.

ANOTHER will now be made to increase the working capacity of the tanks by adding a pump to each and using the leaching liquor over and over again before precipitating. If successful, this will double the present work. In addition, larger and larger tanks will be added to the early spring. At present the leaching is done by the aid of steam, and steam and compressed air are used to force the sulphides through the filtering press. The sulphides when dried are marketed with the Omaha & Grant Smelting Co., at Omaha, and not converted into metallic bars, as was done here some years ago. A reverberatory furnace of ten tons capacity per day is in course of construction at the east end of the works. The slimes in the tailing pits, always carrying well in silver, will be chloridized here, as in the White & Howell roaster the draft is too great and carries too large a proportion of the slimes into the dust chambers. A set of large Krom rolls is also being placed, and will soon be in readiness for work, when custom ore from this and surrounding

districts will be treated at the works. This branch of the business is one much needed in this section and will provide a market for larger quantities of ores, which at present prices will not bear the cost of transportation to Salt Lake markets. W. S. Godbe, manager of the company, with his characteristic energy and push, has brought matters to their present state of perfection, and will not rest until the whole plant is as complete and perfect in every possible detail as modern science can make it. The result of this will be many years of steady business for the old town of Bullionville, for without any outside ores to reduce it is estimated that ten years will be required to work up the tailings at Bullionville and Dry valley, nine miles north, which the company already own.

THE YUBA MINE.—The prospecting and general development work in this mine is showing up some shipping ore on the upraise from the 1300 level, east. A 20-inch vein of heavy lead, free-smelting ore shows up on the west end of the stope, which the company will proceed to ship, though the price of silver is so low. In the east end of the stope the ore vein has widened considerably, showing two feet of 60-ounce ore, which, however, it will not pay to ship at this time. In the levels above, large quantities of similar-grade ore is uncovered, which can be reduced profitably only at some local plant. As soon as the Bullionville Mfg. & Rdn. Co. is ready for the reduction of general ores, regular shipments from this mine will be made to that place.

ARIZONA.

COPPER OUTPUT.—*Phoenix Herald*, Jan. 14: The past year has been one of great prosperity to the O. D. Co. under the able management of Mr. Walker. The output has steadily risen until the year 1892, when the total amount of copper bullion produced reached the enormous figures of 8,019,059 pounds more than was ever produced before in a single year, and the output for the next 12 months promises a still greater showing. The projected railroad from Bowie to Globe seems to be an assured fact, and the knowledge of fast communication with the outside world has caused new life in the camp, and before the year draws to a close it is safe to surmise that the population of Globe will be greatly increased with the iron horse steaming up, our future is indeed bright, and it is safe to presume that this will be one of the most prosperous camps in Arizona, and Gila county will take front rank.

BRIGHT PROSPECTS.—*Gazette*, Jan. 12: Captain John McCassey returned last night from the Harqua Hala, where he has been doing his annual assessment work. He brought in some rich silver specimens from the Leland Stanford, and some rich gold ore from the bottom of the shaft of the same mine. The assessment was done on the Leland Stanford, owned by Geo. H. N. Luhrs, Capt. R. G. Andre and Capt. McCassey. The mine shows a 4-foot vein of carbonate of lead, rich in silver and gold. In the center of the carbonates a vein of quartz ten inches wide occurs in which gold, visible to the naked eye, as large as peas is found. The Golden Chariot, owned by Julian Piercy and Capt. McCassey, has very rich gold ore in the bottom. The Selig mine is in good gold ore. At the bottom of the shaft a vein of quartz has occurred that shows up well in gold. The Selig is owned by Mrs. G. H. N. Luhrs, John McCassey and the heirs of the late Tobias Selig. The clean-up at the Hnbard & Bowers mill amounted to \$73,000 for the month of December. The old Harris mill in the town of Harrisburg is being put in repair to work the old Socorro mine. W. C. Davis and Alex. McKay of Tucson have wonderfully rich gold mines in the new district of Golden, in Maricopa county, 25 miles westerly from the Vulture mine. The ore is ferruginous quartz in granite. The veins are massive. An open cut has been run on the California for 40 feet, and \$50 free gold ore permeates the vein. The Harcuvar Copper Co. uses a diamond drill, and when the captain left it was down 581 feet, with fine prospects of copper. The Vulture mill is idle for want of water, but Mr. Farish is still working the mine and is taking out good ore.

IDAHO.

THE BRYANT & CHAPMAN MILL.—*Statesman*, Jan. 15: F. C. Bryant has decided upon a site for the Bryant & Chapman mill. It is to be placed near the More creek bridge, on the Idaho City road, about 14 miles from this city. Yesterday, Mr. Chapman went East to purchase some new machinery, and the owners expect to have the mill running by March 1st. Mr. Bryant will leave to day for Idaho City to secure the necessary water-rights. This mill is the one which was expected would be established in this city. Mr. Bryant says that the parties who owned the water-rights would not make such arrangements as he considered reasonable, and it was decided to go elsewhere. The mill consists of ten stamps, but will be increased in working capacity in the spring.

OREGON.

STILL IN ABEYANCE.—*Baker City Democrat*, Jan. 15: Notwithstanding that reports have been current on the streets that a reorganization of the Virtue Mining, Milling and Development Company had been effected and that all things had been definitely arranged for the starting up of the old property at once, such is not the case. However, parties are attempting to bring about such a result and have paid off a number of claims against the old concern at a discount. But there yet remain the claims of Parke, Lacy & Co., of Portland, and Basche & Company, to be satisfactorily adjusted before a wheel moves. When such an adjustment occurs it will look like the parties mean business.

DRILL TAPPING.—This forenoon Messrs. T. F.

Foster and Chas. Rebnhn, who, together with Mr. M. Hoff, are the owners of the Bsrber mine in the White Swan district, a parallel vein with the Laura, will leave the city with all necessary camp and mining equipments for a season of development work on the property, which presents very flattering prospects. They contemplate running a tunnel 200 feet in length.

LUCKY BOY AGAIN BONNEN.—The Lucky Boy mine, in the Bonanza district, has again been bonded, and it seems with a good prospect of a future sale taking place. The parties bonding the property are Messrs. L. O. Nelson, of this city, and a Mr. McCormick, a capitalist of Chicago, and under the terms of the bond \$2000 is to be expended in development work, operations to commence at once. Mr. John Jenkins, one of the owners of the mine, is in the city.

MINE JUMPING.—There were quite a number of mining claims jumped and relocated in the Telocaset mining district, by miners from Baker City and elsewhere, New Year's day. The Dierks mine was relocated under the name of the White Rose by J. L. B. Vial of Baker City; the Bonanza, under the name of the Monumental, by some miner from the Cracker creek country. There were also five or six claims located on the ore body in the Government Gulch country, by Baker City people. C. F. Hinckley relocated F. C. Borden's Jim Blaine claim, under the name of the Black Maria. Numerous other abandoned claims were located by different parties. It is hoped the coming season will be one of activity among the quartz ledges on Powder river.

MONTANA.

AROUND BUTTE.—*Inter-Mountain*, Jan. 14: Bar silver shipments showed some signs of improvement for the commencement of the new year. The Alice is now the principal silver-producer of the district, and to mining men this means a great deal, because the Alice is the oldest mine on the Rainbow lead. The Alice shipment this week consisted of 30 bars, which weighed 2806 pounds, the estimated value of the shipment being \$44,896. The Lexington Co. shipped 12 bars, valued at \$27,136. During the year 1892, 738 bars were shipped via the American express of an estimated value of \$1,180,300.

MONTANA DIVIDENDS.—The dividends paid by the mining companies of Montana during the year 1892 were as follows:

Bald Butte.....	\$ 20,000
Bannister.....	6,000
Bi-Metallic.....	200,000
Elkhorn.....	362,500
Granite Mountain.....	500,000
Hedra Con.....	180,000
Helena and Frisco.....	20,000
Iron Mountain.....	135,000
Jay Hawk.....	33,375
Moulton.....	30,000
Pandora.....	3,000
Parrot.....	216,000
Rocky Fork Coal Co.....	100,000

Total.....\$1,805,375

THE EUREKA.—The Eureka mine in Jefferson county, about 20 miles from Boulder, is owned by C. P. Groves. This is a gold proposition, with a shaft about 24 feet in depth. The lead is said to be between eight and nine feet in width and the ore assays all the way from \$18 to \$40 a ton.

THE FREDDIE LEE.—Jim Wardner has for some time past been steadily shipping out ore, and now he is beginning to ship in machinery, says the *Nelson Miner*. This week he brought up from across the line an engine and boiler, which he intends to use to break up the ore of the Freddie Lee into pieces of a size suitable for sacking.

THE ELLA.—Drifting on the lead is still in progress at the Ella, and the leasers are feeling more confident each day that they have uncovered the famous ledge from which thousands of dollars' worth of ore was taken from the Travana, which adjoins the Ella on the west. The first shipment will be made next Monday, after which regular shipments will be made.

NOTES.—The Odin mine, in Dublin gulch, has been started up by Messrs. Kelly & Co. This property is known to contain very rich ore, but the trouble hitherto experienced in the working of it has been the large quantity of water encountered in the shaft. Several leasers have "gone broke" for this reason alone. The Speculator is under lease to Frank Case & Co., and is being worked on the lower level only. At the Parrot mine a new cable is being placed on one side, while the hoisting is being done on the other. The Nora mine, the property of W. A. Clark, has been bonded by the Boston & Montana Co. Stopping is in progress at the Oro Plata and some good ore is being obtained. The Amador is still working under lease to Messrs. Williams, Ralph & Co. The Young America Mining Co. is a new incorporation, organized by Indiana and Montana parties to work the Young America mine, in Jefferson county. The property is said to be a promising one, and the management is confident that development will prove the property to be valuable.

UTAH.

GOLD.—*Salt Lake Tribune*, Jan. 14: George Goss has just returned from the gold-fields in southern Utah, says the *Salt Lake Tribune*, and tells an interesting story of his experience in that gold-laden district. He went down from Green River along the west slope of the Henry mountains to Dandy Crossing, 25 miles south of which place he has placer claims on the Colorado. Speaking of his trip, he said to a reporter: "This is my second trip down in that country, and I know it thoroughly. There is plenty of gold there. That much is certain. But the only impediment is raising water on the bars. It is a capitalist's country; not a poor

man's. It will take lots of pumping machinery to reach the gold and work it profitably. With the proper machinery, any number of bars all along the Colorado will produce paying gold. It does not come in nuggets, but is fine, though not too fine to be treated. The Henry Mountain district is the coming mining country. In my opinion, all the gold found on the Colorado has washed down from the Henry mountains. Every gulch leading from the mountains is lined with gold, but it is impossible to get a sufficient water supply there, the spring freshets being inadequate. The only way that these placers could be worked to any extent is by storing water in reservoirs. But there are two large mines up near Mount Ellen, one of which has been bonded for \$40,000, and the bondsmen will take it, for others stand ready to buy it for \$50,000. The mine is working a mill, and the ore is rich and plentiful. It is only 25 miles from the junction of Colorado river and Alceve creek to good coal mines. They are between the river and Henry mountains, and I believe that, with the placing of big mills in that district, Henry Mountain will become one of the best gold-producing districts in the country." Notwithstanding reports that the San Juan country has but little gold in it, miners are flocking there, and the belief is that the placers are rich and that the reports that they are not have originated from disgruntled men. The *Salt Lake Herald* says of the Green River gold: The passenger office of the Rio Grande Western received the following telegram from Green River station last evening: "Five miles from Green River station, down Green river, parties have just located a placer claim that has every appearance of being rich. Surface pannings show from 75 to 100 colors. There is indication of doing better as bedrock is approached. North of the placer claim is a mineral spring boiling from the bed of the river, and gas can be seen bubbling up from the bed of the river all the way across the stream. The water indicates iron, salt, soda, magnesia. Across the river, and nearly two miles from the mineral spring, is a spring of pure crude petroleum which runs about five gallons an hour. Mr. Meyer, of Ogden, an experienced miner, who has recently patented a machine with which he claims he can save 75 per cent of the finest gold, has been panning on bars down Green river to-day, and claims he will bring his machine here and go to work. He was on his way to the San Juan gold-fields. People who are on their way down Green River to the San Juan gold-fields are stopping to prospect. Intense excitement prevails.

LEACHING PLANT.—*Park Record*, Jan. 14: This week the *Record* man made inquiries concerning the proposed new leaching plant for the Ontario Company and learned that the enterprise was a sure go provided the silver market did not go to pieces before the plans and specification as to cost were prepared and acted upon. Mr. Chambers proposes to know just what the mill, completed and ready for work, is going to cost before the undertaking is started. The grade and grounds for the building were surveyed and mapped out this week, and the cost of the foundation will soon be known. The present intention is to build a mill of much greater capacity than the one now in operation. It will be fitted out with leaching-vats and the Russell process used to reduce the ores. Work will be commenced as soon as the plans and specifications have been drafted and accepted. The mill will be first-class in all its appointments, and, as stated in last week's *Record*, will be first used on the old Ontario tailings dams; and after they are cleaned up, the mill will be started up on Ontario ore. At this writing it is not definitely known just when work will be commenced, though it will probably not be for several weeks, as it will take fully that length of time to prepare plans and figures on the cost of the construction. The signs of the times point very strongly to renewed activity and a large increase in facilities on the part of the Ontario Company, and the rumor floating about several weeks ago to the effect that the company was considering the feasibility of doubling its capacity, is beginning to assume shape, and there is little doubt that with silver at 90 or 95 cents per ounce, such a condition of affairs would come to pass.

THE DALY WEST.—The Daly West will increase its force early next week, and unless the writer is laboring under a wrong impression, will soon fall into line as an active producer and dividend-payer. In a conversation with Supt. J. J. Daly, who was in the camp Tuesday and Wednesday of this week looking after matters about the mine, the *Record* man was informed that the property had not been closed down—the underground force had been laid off that repairs and improvements might be made in the shaft and about the premises, but he thought he would be ready to increase the force about the first of next week.

STRIKE IN THE CALIFORNIA TUNNEL.—There has been a decided improvement in the vein being worked by LeCompte, Rosscamp and others in the California tunnel, and the indications at the present time are that with proper management, the property can be made to pay handsome returns. The *Record* has described the vein in this tunnel several times and spoken of its possibilities, and when informed this week that a new body of high-grade ore had been encountered in the bottom of a 70-foot incline run below the tunnel level, it became interested and sent a representative to look at the strike and make a truthful report as to the exact condition of affairs. The vein was found to be all that was represented, and gives every indication of becoming a paying mine under proper management. The entire tunnel shows ore of a low grade, while the face of the winze 70 feet from the tunnel level shows a five-foot body of ore of a good concentrating grade, and rightly handled will produce pay ore. The truth is that the property gives every indica-

tion of developing into a mine that will pay a handsome profit.

THE STEEL GROUP LEASED.—The above group of claims, seven in number, has been spoken of by the *Record* several times as a most promising prospect. In fact, the property is a very promising one, and it is to be hoped that under the administration of Messrs. Oscar Allison, C. E. Berg and August Lind, who have just secured a two-years' lease thereon, will develop into a bonanza. Mr. Steel has gone just as far as he could single-handed and alone, and not wishing the ground to lie idle, has given a two-years' lease on the same at a royalty of 25 per cent. Active operations will be commenced Monday next.

CAMP CROSSCUTS.—The Crescent mill was started up yesterday to run through a lot of Richardson's lease ore. Ore was bailed at a great disadvantage this week. There was too much snow in the cautions to use wagons and just enough below to make the use of sleighs aggravating and use up stock. W. H. Crockett claims to have cut a large vein of low-grade ore in a piece of ground he is working just below the Glencoe. Jerry Richardson reduced the force at his works during the present week, laying off about ten men. The force at the Marsac mill was also reduced by the discharge of an equal number.

Market Reports.

Financial and Commercial Review.

SAN FRANCISCO, Jan. 19, 1893.

SILVER.—The same stagnant conditions that have ruled in the silver market for some time are still to be chronicled. Quotations in both London and New York have been almost without change for the week, and no activity has been manifested. The recent closing-down of the Rico Aspen Consolidated group of mines in Colorado, caused a small sensation. The Colorado *San* published interviews with prominent mining men, all of whom declare that the step is the result of the depreciation of silver and high wages paid to miners. Another recent feature of moment is the following resolution, by the New York Metal Exchange, at a special meeting called January 9th for that purpose: "Resolved, That we demand the prompt repeal of the laws under which authority is given for the purchase of silver by the U. S. Government, and that the president and secretary and two members of the Exchange be, and are hereby appointed a special committee to deliver a copy of this preamble and resolutions to the President of the U. S. and to the Senators and Representatives in Congress."

IRON.—A dispatch from New York of date Jan. 16th reads: "At the New York Metal Exchange to day very little else was talked about than the sharp advance in the price of tin. It is alleged that several prominent operators in the local market have entered into an agreement to create a 'corner,' There was a fear on the part of the bears that some of the bear traders who had orders to fill would be seriously embarrassed, and that the noted tin corner of a few years ago would be repeated. There was also talk of a movement by the bears to counteract the 'corner,' and the market continued in an unsettled condition." The reported corner and the advance have had no appreciable effect on the market here.

PIG IRON.—Reports from Philadelphia are to the effect that pig iron is beginning to move in large volume, and on the whole, the indications seem to favor a fair degree of activity, but at distinct concessions from the figures ruling before the holidays.

STEEL BILLETS.—A lower tone pervades the eastern market. Buyers are very indifferent, while sellers are increasingly anxious.

THE LOCAL MARKETS.—There are no features to the local metal markets of this city.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	@ 13	English, lb.	@ 18
BORAX.	@ 75	Canton tool.	@ 85
Refined, in car lots	@ 75	S. V. steel grade	@ 85
Concentrated, do.	@ 75	Pick & Hammer.	@ 15
All grades jobbing at advance.	@ 75	Machinery	@ 10
COOPER.		Toe Calk.	@ 44
IRON.		TIN PLATE.	
Bolt.	@ 22	14x20, spot.	@ 5 7/8
Sheeting.	@ 22	14x20, do.	@ 5 7/8
Ingot, jobbing.	@ 22	Do, roofing, 14x20.	@ 5 7/8
Do, wholesale.	@ 22	Do, do, 20x22.	@ 11 7/8
Pine Box Sheets.	@ 22	PIG TIN.	
IRON.		Spot, lb.	@ 24
Bar, base.	@ 41	COAL.	@ 24
Norway, base.	@ 41	SPOT FROM LONDON—PER TON.	
PIO IRON.		Wallingford.	\$9 00
Eglington ton.	20 00	Gra.	5 00
Glenagran ton.	21 00	Nanaimo.	6 00
Am. Soft, No. 1.	22 00	Gilman.	6 00
Oregon Pig.	20 00	Seattle.	5 00
Puget Sound.	20 00	Ocos Bay.	5 00
Olay Lane White.	22 00	Cannel.	8 00
Langdon.	22 00	Egg bar.	12 00
Thorncroft.	22 00	Dumbarland, in sacks.	15 00
Gartbarrie.	22 00	Do, bulk.	14 00
Barrow.	22 00	Walsend.	7 00
Osgood.	22 00	Scott's Splint.	7 00
CHROME IRON ORE.		Brymbo.	7 00
Perton.	10 00	West Hartley.	7 00
LEAD.		SPOT FROM LONDON—PER TON.	
Pig.	@ 41	Australian.	5 37 1/2
Bar.	@ 41	Liverpool Steam.	5 00
Sheet.	@ 41	Scott's Splint.	7 00
Pipe.	@ 41	Cardiff.	8 75
COPPER.		London.	11 00
Drop, sizes smaller than		Cumberland.	12 00
B, 8 1/2 x 2 1/2.	\$1 85	Egg, bar.	10 00
Do, do, B and larger sizes		West Hartley.	7 00
3 1/2 x 2 1/2.	2 10	COKE.	
Buck, Bales and Chilled		English, to load.	\$8 00
do, bag, 1 1/2 x 2 1/2.	2 10	Do, spot, in bulk.	@ 9 50
QUICKSILVER.		Do, in sacks.	@ 21 50
Home trade, per		Cumberland.	9 00
do, 1 lb.	\$1 50		
For export.	\$3 50		

Eastern Silver Markets.

New York, Jan. 19.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.
Thursday.	38 1/2	83
Friday.	38 1/2	83
Saturday.	38 1/2	83
Monday.	38 1/2	83
Tuesday.	38 1/2	83
Wednesday.	38 1/2	83

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JAN. 3, 1893.

489,406.—PINKING SHEARS—Louise Austin, Whatcom, Wash.	489,379.—GRAVEL WASHER AND SEPARATOR—F. T. Gilbert, Walla Walla, Wash.	489,380.—GRAVEL WASHER AND SEPARATOR—F. T. Gilbert, Walla Walla, Wash.	489,301.—THRASHER AND SEPARATOR—M. O. Godding, Monrovia, Cal.	489,128.—BALANCED SLIDE VALVE—J. P. Lightbody, S. F.	489,129.—BALANCED SLIDE VALVE—J. P. Lightbody, S. F.	489,168.—FRUIT EVAPORATOR—Sperl & Geom, Los Angeles, Cal.	489,339.—DEVICE FOR RAISING LOADED TRUCKS—B. H. Stephens, Woodland, Cal.	489,422.—CONDUIT FOR ELECTRIC RAILWAYS—C. P. Tatro, Spokane, Wash.	489,056.—TOASTING TONGS—F. A. M. Westheimer, S. F.	489,063.—NONSHRINKING STOVE—R. F. Wilson, Stockton, Cal.
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FOR WEEK ENDING JAN. 10, 1893.

489,599.—INDEX DEVICE—S. F. Baker, Santa Barbara, Cal.	489,451.—BUGGY TOP—J. T. Bibb, Tacoma, Wash.	489,784.—PIPE UNION—J. T. Bibb, Tacoma, Wash.	489,452.—AUTOMATIC BRAKE—A. G. Billings, Lake Park, Wash.	489,785.—HOISTING AND CONVEYING MACHINERY—F. C. Birch, S. F.	489,792.—BORER FOR WALKS, ETC.—J. E. Chapman, San Jose, Cal.	489,795.—ENOINE-STEADYING DEVICE—E. C. Emde, Tacoma, Wash.	489,811.—TRACTION ENGINE—Benj. Holt, Stockton, Cal.	489,814.—MANUFACTURE OF BUTTER—Hudson, La Strong & Birch, Los Angeles, Cal.	489,903.—CAN-LACQUERING MACHINE—R. D. Hume, Gold Beach, Or.	489,744.—CONCENTRATOR—Geo. Johnston, S. F.	489,747.—FILTER—Jos. Kraker, S. F.	489,609.—WASHING MACHINE—S. B. Letson, Colfax, Wash.	489,564.—KEY-TOUCH ADJUSTER FOR PIANOS—F. B. Long, Los Angeles, Cal.	489,566.—BUTTER MOLD—Mann & Johnson, Los Angeles, Cal.	489,751.—HYDRAULIC-MINING APPARATUS—N. C. Miller, French Corral, Cal.	489,755.—ELEVATOR HATCHWAY—C. M. Prevear, S. F.	489,761.—DETONATING COMPOUND—Sam'l Rodgers, S. F.	489,833.—CHURN—S. J. Saxon, Colfax, Wash.	489,511.—AX-HANDLE SHIELD—C. S. Terpening, Dayton, Wash.	489,665.—PRINTER'S CABINET—G. M. Williams, Santa Rosa, Cal.	22,104.—DESIGN—G. F. Schroeder, Mill Valley, Cal.
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The following brief list by telegraph, for Jan. 10, will appear more complete on receipt of mail advices:

California—Jonathan Edwards, Sanger, furniture; Augustin J. Galindo, Concord, wagon-jack; Christopher Grattan, Stockton, braks for harvesters; Alexander Janson, San Francisco, lounge; Charles W. Lockman, Crescent City, ventilator; E. A. Rix, San Francisco, clutch for rock-drilling machine; Alfred F. McMillan and T. Gormley, Beicola, gang-plow; H. P. Nielson, Alameda, automatic releasing device; E. S. Rayburn and C. A. Bell, San Jose, hand-truck; Peter V. Shandoney, Sacramento, draft-equalizer; James Scott, Bethany, tug clip for hames; John P. Summons and E. J. Holmes, San Francisco, adjustable rock-crusher; A. Livingston, San Francisco, can-body forming machine; E. J. Molara, San Francisco, camera shutter.

Washington—Ernest Bernini, Tacoma, egg-cutter. Oregon—Herbert A. Corlies, St. Helena, self-hoisting floodgate; Thomas A. McFarland, Portland, sketching device.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ELEVATOR HATCHWAY ATTACHMENT.—Chas. M. Prevear, S. F. No. 489,755. Dated Jan. 10, 1893. This attachment for elevator hatchways is especially applicable for sidewalk elevators. It consists in certain details of mechanism whereby the hatchway is opened by the rising of the elevator, and closed and locked automatically as the elevator sinks below the sidewalk.

BORER FOR WALKS.—James E. Chapman, San Jose, No. 489,792. Dated Jan. 10, 1893. This is a new article of manufacture called by the inventor a "horder corrh and base." Its object is to provide a permanent corrh or horder for garden and other walks or paths and to surround beds and inclosures of any description. The idea is to provide a permanent corrh or border having a horizontal base extending outwardly from the path or walk, of which it forms the border, and the sections of which it

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		NO. AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada.	10	100	Dec 20, Jan 24, Feb 14.	O E Elliott, 369 Montgomery
Belle Isle M Co, Nev.	17	100	Jan 9, Feb 14, Mar 8.	J W Pew, 310 Pine
California Iron and Steel Co, California.	7	200	Nov 25, Dec 31, Jan 23.	F Bonanza Ins, 428 California
Osra M & Co, California.	2	81	Oct 19, Jan 23, Feb 17.	G C Coleman, 16 Fremont
Challenge Cons M Co, Nevada.	13	250	Nov 30, Jan 4, Jan 25.	O L McElroy, Mills Building
Commonwealth Iron Co, Nevada.	10	100	Nov 23, Dec 30, Jan 24.	R R Grayson, 331 Pine
Confidence S M Co, Nev.	22	750	Dec 24, Jan 25, Feb 15.	A S Groth, 414 California
Cons California and Virginia M Co, Nevada.	3	500	Dec 13, Jan 21, Feb 10.	A W Havens, 30 Montgomery
Cons Imperial M Co, Nevada.	34	300	Nov 22, Jan 18, Feb 8.	O L McElroy, Mills Building
Crown Point M Co, Nevada.	59	250	Dec 23, Jan 24, Feb 11.	J Newlands, Mills Building
Del Monte M Co, Nevada.	7	100	Nov 23, Dec 27, Jan 21.	J W Pew, 310 Pine
Evening Star M Co, California.	10	100	Dec 6, Jan 12, Jan 31.	J F Curtis, 325 Montgomery
Gold Mountain M Co, Cal.	4	82	Dec 21, Jan 28, Feb 15.	A R Thompson, 309 Montgomery
Hale & Norcross M Co, Nev.	103	500	Jan 7, Feb 10, Mar 3.	T Wetzel, 320 Sansome
Jackrabbit M & M Co, Nevada.	2	50	Dec 23, Feb 8, Mar 2.	R C Kelly, 419 California
Justice M Co, Nev.	53	100	Jan 5, Feb 8, Mar 2.	G O Edwards, 411 California
Martin White M Co, Nevada.	28	250	Nov 26, Jan 16, Feb 21.	E B Holmes, 309 Montgomery
Overman M Co, Nevada.	65	250	Jan 10, Feb 14, Mar 7.	W Ladd, 531 California
Ray Belcher & Miles M Co, Nev.	11	250	Jan 5, Feb 7, Feb 27.	R F Fones, 306 Pine
Silver Lick Cons M Co, Nevada.	3	20	Nov 22, Jan 3, Jan 25.	A Halsey, 328 Montgomery
Siskiyou Cons Quicksilver M Co, California.	1	100	Dec 16, Jan 20, Feb 10.	A Halsey, 328 Montgomery
South Eureka M Co, Cal.	2	200	Jan 4, Feb 10, Mar 6.	A Halsey, 328 Montgomery
Utah Cons M Co, Nevada.	16	100	Dec 13, Jan 13, Feb 9.	A Halsey, 328 Montgomery
Yellow Jacket S M Co, Nevada.	53	300	Dec 6, Jan 10, Feb 14.	W H Blauvelt, Gold Hill

COMPANY AND LOCATION.		AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer M Co, California.	5	100	L Perkins, Mills Bldg.	Oct 20
Champion M Co, California.	10	100	L Perkins, Mills Bldg.	Dec 19
Great Western Quicksilver M Co.	25	25	A Halsey, 328 Montgomery.	Dec 8
Mayflower Gravel M Co, California.	25	25	D M Kent, 330 Pine.	Jan 10
Pacific Coast Borax Co, California.	1 00	1 00	A Halsey, 328 Montgomery.	Jan 10
Standard Cons M Co, California.	10	100	J W Pew, 310 Pine.	Dec 23

is made are corrugated so as to divert irrigation water outwardly from the path and directly into the beds where it is to be used.

CAN-LACQUERING MACHINE.—R. D. Hume, Gold Beach, Oregon. No. 489,903. Dated Jan. 10, 1893. This is an apparatus which is adapted to apply lacquer to the exterior surfaces of cans containing hermetically sealed goods, the lacquer being applied after the cans are filled and sealed, for the purpose of giving the proper finish to them. The patent covers certain details of construction in the machine.

DETONATING COMPOUND.—Samuel Rodgers, S. F., assignor to the American Cap Co. No. 489,761. Dated Jan. 10, 1893. This is a detonating compound which is specially applicable for use in caps to be employed for exploding charges of powder.

ORE CONCENTRATOR.—Geo. Johnston, S. F. No. 489,744. Dated Jan. 10, 1893. This is a traveling-belt concentrator, and the invention consists in the novel improvements in the pulp and water-distributors. The objects of the invention are, first, to distribute the pulp upon the belt in narrow channels in the direction of its travel, and as close to it as possible, leaving wide spaces upon the belt between the discharge courses, where the sulphurets can remain undisturbed by any fall of water or sand, and pass up to the clear water at the head of the belt, the sands at the same time passing down in the same channels without obstruction to the foot of the belt; second, to deposit the clear water in the same channels on the belt, from a platform or board having narrow slots in the line of said channels, and so arranged as to discharge the water without pressure and with the least possible splash. By the ordinary method the pulp is generally discharged from an apron across the front of the pulpbbox, usually in a shallow, continuous stream, and also in a number of streams some distance from each other across the width of the belt. It is to avoid the resultant disturbance of the sand and sulphurets that these improved pulp and water-distributors have been devised. By the peculiar construction of this inventor's pulpbbox, he drops the pulp, not indiscriminately across the belt, but only in specified definite places through the narrow slots. It is thereby deposited in narrow channels on the belt, and being close to its surface it falls without much splash or disturbance. A large portion of the surface of the belt is undisturbed by the fall of the pulp, and the sulphurets working to each side of the line or channels in which they were deposited form in parallel rows in the spaces between said lines or channels and ascend to the clear water at the head of the table. The sand particles have no splash to obstruct their downward flow, but pass down the same channels or lines to the foot of the board. The clear water is similarly applied. It falls gently without pressure and with as little splash as possible and directly into or upon the same channels or lines upon which the pulp was deposited, said lines or channels being bare by the time the water discharges are reached, occasioned by the working of the sulphurets into the parallel side-rows and the downward flow of the sand. The slots in the pulpbbox and water-frame are arranged in line to effect this deposit of the pulp and the water in the same lines or channels. As a

result of this construction, about two-thirds of the belt is undisturbed by any splash of sand or water, the capacity of the belt is increased and cleaner work is done.

The Mining Share Market.

Trade in mining stocks continues dull with a decline in several securities. The depression in the stock market is very hard on the brokers, and there is no present prospect of a very radical change. The project to pump out the mines on the Comstock and renew deep mining is hoped for up on the lode, but all hands must join. On Monday pumping operations in the Gold Hill group of mines were suspended. The sinking pumps in the Crown Point are being hauled up above the water line, and the main pumps that will be left in position are to be painted to preserve them when the water reaches a point above where they are stationed. The project for consolidated pumping along the entire lode has not yet been consummated, and should a favorable understanding be arrived at, it will take several months to arrange details. Hence the Gold Hill association does not feel justified in continuing the work at a loss without deriving any material benefit.

At the annual meeting of the stockholders of the Brunswick Mining Company the following officers were elected: J. R. Robinson, president; J. J. Halpin, vice-president, and T. H. Chandler, H. W. Philbrook and W. C. Wallace, directors. H. R. Lounsbury was elected treasurer and general manager, W. C. Hawley, superintendent, and J. Siadtfield Jr. secretary.

At the annual meeting of the stockholders of the Bullion Mining Company about 90,000 shares were represented and the following officers elected for the ensuing year: Thomas Cole, president; Thomas Anderson, vice-president, and Charles Hirschfeld, C. W. Kellogg and J. H. Souther, directors. R. R. Grayson was re-elected secretary and A. C. Hamilton superintendent. The secretary's financial statement showed a credit of \$8760.54.

The stockholders of the Sierra Nevada Silver Mining Company have re-elected the following officers: Charles H. Fish, president; Charles Hirschfeld, v. c. president, and Herman Zadig, George W. Cope and A. K. P. Harmon, directors. E. L. Parker was re-elected secretary and A. J. McDonnell superintendent. The secretary's report showed a credit of \$9603.17.

Local securities were quiet this morning.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, Jan. 19, 1893.

9:30 A. M. SESSION.

100 Alpha.	100	100 Mexican.	1.40
450 Belcher.	1.05	300 Opit.	1.55
500 Best & B.	1.20	350 Overman.	1.80
300 Bullion.	.70	500 Peerless.	.50
500	.75	450 Potol.	.12
350 Cal. & Va.	.80	1200 Potol.	1.55
300 Conf.	1.15	200 Sierra Nevada.	1.20
500 Con. N. Y.	.50	500 Utah.	1.05
350 Kentuck.	.10		

2:30 P. M. SESSION.

100 Alpha.	.25	50 Hale & Norcross.	.75
450 Belcher.	1.05	350 Mexican.	1.50
500 Best & B.	1.20	350 Potol.	1.50
300 Bullion.	.70	500 Potol.	1.55
500	.75	450 Peerless.	.50
350 Cal. & Va.	.80	1200 Potol.	1.55
300 Conf.	1.15	200 Sierra Nevada.	1.20
500 Con. N. Y.	.50	500 Utah.	1.05
350 Kentuck.	.10		

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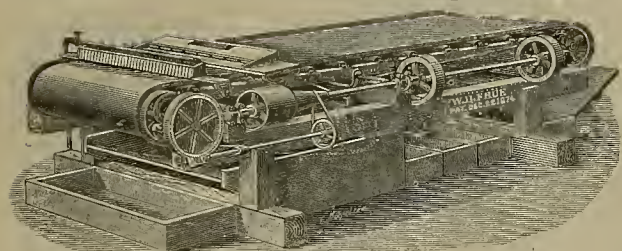
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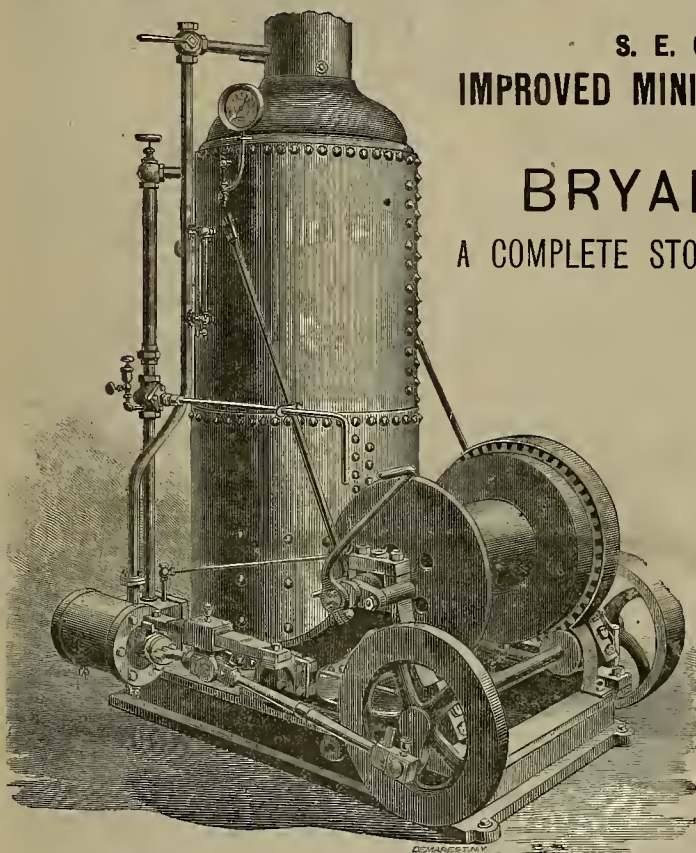
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Direct Acting Hoisting Engines,
Geared Hoisting Engines,
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De Rycke Centrifugal Steam Separators,
Conover Condensers,
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Webster Vacuum Heaters,
Hawley's Smokeless Furnace,
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Duplex and Marsh Steam Pumps,
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Centrifugal Pumps,
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Heine Sectional Safety Boilers,
Tubular, Firebox and Flue Boilers,
Hunt's Rope Transmission,
Water Jacket Smelting Furnaces,
Hydrants and Water Gates,
Metz Pump Regulators,
Chlorination Works,
Silver Stamp Mills,
Matheson Patent Lock-Joint Pipe,
Hydraulic Riveted Water Pipe,
Cable Road Machinery,
Sheet Steel and Iron Pipe,
McClave Rocking Grates,
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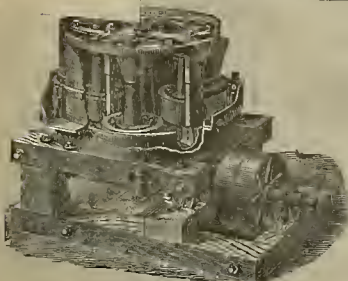
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VOL. LXVI. - Number 4.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JANUARY 28, 1893.

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SINGLE COPIES, 10 CENTS.

To Prevent Floods in the Valleys.

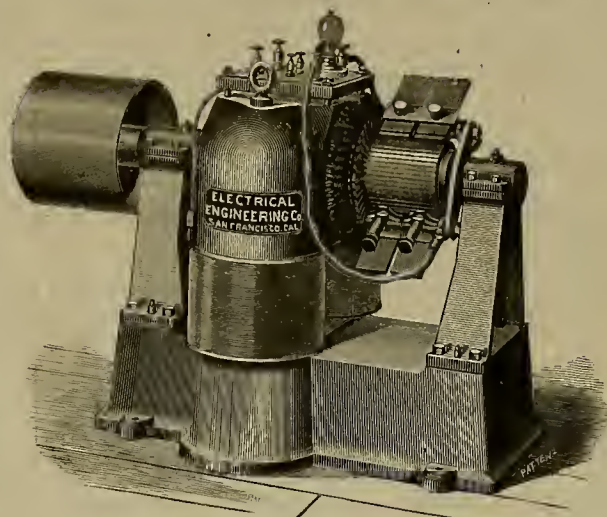
The Drainage and Reclamation Convention in session at Sacramento decided to recommend the planning and construction as an entirety of a complete and unpretentious system of drainage and reclamation. It appears from the report of its engineers: First—That there exists an area of 800,000 acres of submerged lands in the Sacramento valley partially reclaimed by the existing works constructed and maintained against adverse natural conditions under increasing burdens of cost by reason of the absence of a comprehensive system of reclamation embracing the entire area. Second—That the construction of such a complete and comprehensive system of reclamation, to be thoroughly effective, is possible at a cost per acre of less than the cost per acre of the partial reclamation already effected, and that the engineering data already exists for the planning of such a system. The engineers have reported that the rivers of the Sacramento valley, in their present condition, do not afford sufficient flood-drainage capacity, and building a bank protection alone will not prevent the annually recurring disasters nor afford reasonable protection to the valley lands. Recognizing this fact the committee reports that aside from the works required to accomplish local protection, others of general benefit are necessary to facilitate and hasten the flood discharge to the bay and to control the surplus water. The treatment of the flood-carrying capacity of natural watercourses must be increased, and the works, to accomplish this end, must be supplemented by drainage channels of sufficient capacity to control and receive the surplus water.

The opinion is expressed by the engineers that, aside from the work of channel treatment for many years, the property benefited should be prepared to incur within the period of five years an expenditure of \$8,000,000 to \$10,000,000 for the work and general benefit, and that this expenditure is justified and advisable, and will afford reasonable protection to all the lands of the Sacramento valley. All of this forms a pretty "big contract," but the engineers are doubtless right in recommending a comprehensive scheme. Small attempts here and there are costly and effect little good. By systematic general plans everybody will be benefited. The engineers say that levees alone will not answer the purpose, which is a very evident proposition. In the early days of this State the valleys were flooded as now. As the land became settled levees were built and the waters no longer had the chance to spread laterally. They must therefore rise in flood times, and this season were higher than ever before. Mining debris, natural wash and agricultural operations have all contributed to shoaling the river system to a greater or less extent. But, as stated, there were floods before hydraulic mining or plowing was carried on along the borders of the tributaries of our great rivers. Reclamation schemes have kept the water back from certain tracts and thrown it upon others. The waters cannot spread laterally, as before the levees were built, and when they rise and break through great damage is done.

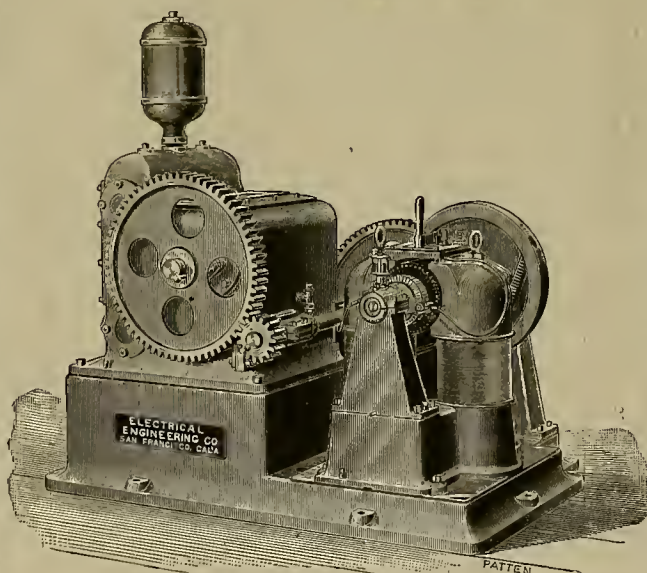
The physical conditions are such that an expensive, comprehensive plan must be adopted, which will give the flood waters a chance to reach the ocean without obstruction. Obannels must be deepened and straightened. The water rushes from the mountains and strikes the level of the valley, where its speed is slackened and it is confined between narrow banks. At certain seasons floods must result unless means are devised which will permit the storm

water to drain off more rapidly. It is with this object in view that a comprehensive plan of drainage and reclamation is suggested.

THE Senate Committee on Mines and Mining will report favorably an important measure introduced by Sena-



CONSTANT POTENTIAL DYNAMO OR GENERATOR.



THE DARDANELLES MINE ELECTRIC PUMP.

tor Ford, providing that hydraulic mining may be carried on wherever it can be done without injury to navigable streams. The same course will be taken with Ford's bill creating a board of debris commissioners and appropriating \$20,000 to construct dams and restraining works, provided that Congress appropriates at least the same amount.

THE famous Conception silver mine at Atorco, State of San Luis Potosi, Mexico, is on fire, and one work after another is collapsing. The fire broke out in the main shaft, which collapsed, causing a heavy loss of life. Thirteen corpses have already been recovered. The destruction to property and the paralyzation of work will entail financial loss of over \$1,000,000.

By an explosion in the Fortschritt mine at Dux, Bohemia, on the 23d, 80 miners lost their lives.

Electric Power in Drift Mining.

The electric power and lighting-plant installed by the Electrical Engineering Co. of San Francisco for the Dardanelles mine, Placer county, Cal., consists of a 25-horse power Keith electric generator, a 6-horse power electric pump, a 6-horse power electric hoist and 50 incandescent lamps. The pump and hoist are operated by Keith motors. The electric plant was substituted for the cable transmission previously used.

The Dardanelles is a prominent gravel mine, on one of the ancient river-beds, which, before the antidebris decisions, was a large producer of gold by the hydraulic method. It is now, however, worked by the drift method. This latter necessitates the use of a tunnel one-half mile long through the rim rock. At the inner end of this tunnel is an incline of 330 feet, up which all the water and gravel from the mine must be raised before passing out to the mill through the tunnel.

The power to run the pump and hoist used before the electric plant was installed was conveyed to them through the tunnel by the use of a continuously-running wire cable one mile long. The expense of keeping this cable system in working order was enormous when renewals, delays and damages were taken into account. Two cables costing \$1400 were worn out each year, and many delays were caused by the stranding of the cable, which necessitated frequent repairs and the consequent delays.

By the substitution of power transmission by electricity, the expense has been reduced to the minimum, so that the initial expenditure of power has been decreased fully three-quarters.

This is an important matter, especially as during four months of each year steampower must be used, because the waterpower belonging to the mine, and used during eight months, is not then available. Three cords of wood were used each day to run the cable, but less than one cord is necessary by the electric system, even when the 25 electric lights in the tunnel and incline are continually lighted. The further saving of wear and tear is of much importance. No additional men to those otherwise employed in the mill and mine are engaged in operating the electric plant.

The mine is owned by Gen. Jo Hamilton of Auburn, and the superintendent is H. F. Calenberg at Forest Hill. We illustrate the generator and pump in use, and will shortly do the same with the hoist.

DISCOVERY OF GOLD IN CALIFORNIA. — On Tuesday evening Mr. John S. Hittell delivered a lecture before the Pioneer Society in this city on "Marshall's Gold Discovery." "To-day," said the lecturer, "is the forty-fifth anniversary of the greatest event in the history of our State, the day when the gold deposits of the Sierra Nevada were discovered at Coloma by James H. Marshall. It was the 24th of January, 1848, that caused the great migrations of 1849 and of subsequent years to California, and that made the admission of our State into the Union on September 9, 1850." He explained fully his reasons for fixing the date of Marshall's discovery as January 24, basing his authority upon the entries in the diaries of Henry W. Bigler, Azariah Smith and Captain Sutter, although Marshall himself had variously given the date as January 18, 19 or 20. He spoke of the annual celebrations of the admission of the State into the Union, and gave his reasons why the anniversary of the more important event of the gold discovery had never been celebrated.

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Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, January 28, 1893.

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Comment.

The legislature has before it a bill providing for the appointment of a board of examining engineers to license engineers of portable and stationary engines. It does seem rather odd, on consideration, that the fact of an engine being afloat makes it necessary to have a man over it who understands his business, while one ashore can be run by a Chinaman if the owner pleases. Every engine on a steamboat, for business or pleasure, comes under U. S. regulations, and the engineer must be licensed. Stationary engines in cities or towns, or portable ones on farms or fields, may be run by Tom, Dick or Harry without license or supervision of any kind. No inquiry is made as to his qualifications or whether he knows the first principles about steam or steam engines. As long as he can stop and start the machine and read the gauge, he is supposed to be all right. At any rate, this kind of engineer prevails everywhere. The only wonder is there are not more frequent accidents. Should the proposed bill become a law, engineers would have to pass some kind of examination before being allowed to run engines, which would result in a better class of men to handle stationary and portable engines.

A notable decision was rendered this week by the Superior Court of Alameda county. In a suit over the Oakland water-front, not only the Oakland Water Front Co., but all the claimants were thrown out, the decision being that the title is absolutely vested in the State without power to grant it away, and no previous judgments of the State courts are of effect. The opinion of the court is based on the recent U. S. Supreme Court decision in the Chicago water front case, where it was held that the State could not convey to private ownership. The court says:

It would seem to be that the town of Oakland, being a creature of the State and a part of its government, was selected by the State as the trustee of this property. The town has no greater power of disposition over the property than had the State itself. Since the State could not dispose of the property in gross, its trustee, the town, could not do so, neither could it ratify or confirm any such attempted disposition of it.

A formal motion for a nonsuit was then made and granted by the court. A. A. Moore, for the Water Front Company, then made a statement and moved for a stay of 60 days in which to prepare an appeal, and this was also granted. The Oakland Mole, Long Wharf, the Peraltastreet freight slips, the Broadway creek-route wharf, the narrow-gauge wharf, all go with the decision and are now on State property. Everybody who held title through the Water Front Company and the Carpenter grant also found themselves without title. This includes the Pacific Iron and Nail Works, at the foot of Market street; the Oakland Gas, Light and Heat Company, at the foot of

Grove street; Remillard Brick Company, at the foot of Clay street; the Merritt property, now under lease from the Garcelon estate by the Puget Sound Lumber Company, and Taylor & Co., lumber dealers, covering a block of water front between Washington and Clay streets, and all of the recent wildcat claims that have been made during the recent water front excitement. The decision is a sweeping one and affects the water front all along the whole bay shore. It will go a long way toward settling the title and be a great thing for commercial and manufacturing enterprises needing a water-frontage. Should the decision be sustained, which appears probable in view of the U. S. Supreme Court decision, the water front of Oakland will come under the supervision of the State Harbor Commission, just as the San Francisco water front is. At all events, the land bordering on the harbor can be utilized, and the railroad can no longer control it or the city.

The Future of the Comstock.

Those most directly interested in the future of the Comstock lode—the residents of the vicinity—are seriously considering the situation up there, recognizing the fact that unless there is some change in present conditions, active operations in mining properties must practically cease. At a meeting of the Washoe Club there were present J. B. Overton of the Virginia and Gold Hill Water Company, Mining Superintendents J. H. Kinkead, A. J. McDonel, P. Kervin, E. D. Boyle, J. R. Ryan, D. B. Lyman, S. L. Jones and C. C. Thomas of the Comstock Tunnel Company. Those present organized themselves into a committee of the whole by the appointment of D. B. Lyman as president and James H. Kinkead, secretary.

After organization the outlook of the mining interests of the Comstock was discussed pro and con. It was the universal opinion that urgent steps should be taken immediately to revive the drooping prosperity of the lode. It was thought a reduction might be made in freights and fares and railroad charges for transporting ores; also in the price of milling and the furnishing of water to the mining properties. Subcommittees were appointed to discuss ways and means to secure various reductions needed to insure future prosperity in mining and milling operations. The Mining Stock Association has already pointed out, in a very vigorous manner, sundry reforms that should be made, but as many of these conflict with the moneyed interests, but little attention has been paid to them. Now, however, that the gentlemen mentioned have taken the matter up, some good should result. They know of the abuses that exist, and should see some remedy. High charges for freight and water must cease, and at once. The mill ring operations should also be stopped. The public have got out of conceit with the mining share market, since the mines and the public have been "milked" for years. Now it has come home to the residents of the Comstock that they must give some assistance themselves toward reform, or else they will be let severely alone and must work out their own salvation.

It is rather late in the day to begin, since the abuses have existed for many years and have been constantly protested against by investors. If the people on the lode take up the idea of reforms with a firm hand and without fear, they may put a different face on affairs; but if they content themselves with passing resolutions and do not carry them out, the Comstock will fall into the same decadence as other silver camps in Nevada.

A Proposed State Debris Commission.

Senator Ford of Sierra county and Assemblyman Thomas of Nevada county have introduced bills providing for the appointment of a debris commission to consist of three civil engineers at a salary of \$250 per month, whenever any board of engineers of the United States Government shall be appointed with power to adopt plans and specifications for the construction of works for the impounding of mining debris, the commissioners to consult and advise with the board of engineers and to examine and pass upon the merits of such work, and shall determine by vote whether or not such works are sufficient to protect the navigable waters of the State. The bill appropriates \$250,000 to be used in the construction of works for the restraining or impounding of mining debris in California. It is provided, however, that no warrant shall be drawn against the sum appropriated until the Federal Government shall have appropriated at least an equal amount for like purpose. The term of office of the debris commissioners shall be four years from the date of their appointment, and before taking office each commissioner shall give the sum of \$50,000 for the faithful discharge of his duties.

The object of this bill is to create a State Commission to cooperate with the Government Commission of Engineers in constructing debris dams to keep back the debris now

in the rivers. It will be remembered that the debris bill now pending in Congress says, "That for the purpose of securing harmony of action or expenditures on the work to be done by the United States and the State of California respectively, the former in its plans for the improvement and protection of the navigable streams and to prevent the depositing of mining debris or other materials within the same; and the latter (United States) in its plans authorized by law for reclamation, drainage and protection of its lands, the said commission is empowered to consult thereon with a Commission of engineers of said State if authorized by the State for such purpose," etc. The Congressional bill also provides for future appropriations (without specifying any sum) to build at such points above the head of navigation on the Sacramento and San Joaquin rivers, or the main tributaries, such dams or settling reservoirs, canals, locks, or other works as will keep the debris from coming into the navigable streams. Under the Ford and Thomas bill, the two boards could consult and carry out joint plans each controlling its own expenditures. If the antidebris people are wise they will study their best interests by joining hands in this movement. No money will be spent unless the Government spends a like amount. If no Government appropriations are made for the purpose then the State money is not touched. The dams are not intended for miners to dump their debris into, but to hold back what is in the rivers now. The Congressional bill provides for the mining dams which will prevent any more coming in hereafter. Both sides to the debris controversy can properly support this measure.

The Miners' Association and the Caminetti Bill.

The executive committee of the State Miners' Association has been subjected to some criticism because it asked Senator Felton to have consideration of the Caminetti bill deferred, just as it was about to pass the Senate. In fact, in another day it would have passed both houses and become a law. There was good and sufficient reason, however, for asking for this delay, since in its present form, as amended lately, the bill is obnoxious to the hydraulic miners of the State, for whose benefit it is supposed to be drawn. Most of them would prefer no bill at all rather than this one as it is.

After Congressman Caminetti made the original draft of his bill, it was very materially altered to meet certain contingencies which arose. The miners' representatives in Washington were obliged to concede many points to which they had objected, in the interests of harmony, and to conciliate their opponents. They had to take the best they could get, and that best was the Caminetti bill as it passed the House. When it went to the Senate for consideration, Senator Felton inserted sundry amendments, among which was the word "must" instead of "may" in Section 9, which compelled every hydraulic miner, whether then legally working or not, to file a petition for permission to mine; to surrender to the commission the right and privilege of selecting the method of restraining the debris; and to pay three per cent of the gross output to the United States, even if already mining by permission of the courts.

When this amended bill was considered by the State Miners' Convention in January, it was indorsed, with exceptions, by the following resolution:

Resolved, That the State Miners' Association of California approve of the Caminetti bill, with the amendments proposed by Senator Felton, and recommend the interest of the mining industry of California the passage of that bill, with the amendments; but we further recommend that all reasonable efforts be made to secure an appropriation of \$450,000 for the purpose of the construction of the dams provided for in said act; and we recommend that the word "must" contained in section 9, as proposed by the amendment of Senator Felton, be rejected, and the word "may," as contained in the original bill be restored, or that there be added to the bill the following proviso: "Provided, that this act shall not be so construed as to prohibit the carrying on of any mining operations, prior to the construction of said dams, which can be conducted without material injury to the navigable streams of the State or lands adjacent to said streams."

These proposed amendments were submitted to Senator Felton and Mr. Caminetti while they were here in the city. When, however, the matter came up in the Senate no attention was paid to these requests, no modification was made, and the Senate Committee passed favorably on Mr. Felton's amendments without protest being made as far as the executive committee in this city can learn.

Just at that time, however, ex-Congressman C. P. Berry of Sutter county appeared in Washington in behalf of certain antidebris men of the Sacramento valley, and succeeded in having added to the already objectionable bill a penalty clause, which reads as follows:

"Any person or persons, company or corporation, their agents or employees, who shall mine by hydraulic process in violation of the provisions of this act, shall be punished by a fine of not exceeding \$5000, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court."

No protest appears to have been made against this sweeping penalty clause, nor any modification suggested by the senators or representatives from this State. When the executive committee of the Miners' Association heard of it, they telegraphed to Senator Felton asking him to have the clause so modified as to exclude at least those

mines now legally working and doing no damage. He replied that he would submit the proposition to the senators, but expressed no opinion. The executive committee of the association then decided to send a representative to Washington to secure, if possible, an amendment to the penal clause to make it apply only to mines which do damage to the rivers and which are interdicted by the courts. The association is short of funds and before the money could be collected to send any one to Washington, it was learned that the bill was about to pass as it stood. The executive committee therefore telegraphed at once to Senator Felton asking him to defer consideration of the bill until the miners' representative could get there and explain the miners' views.

As stated, the Miners' Association has been criticized for this action, because it had already indorsed the bill, and the State Legislature had also indorsed it and asked for its passage. But it will be seen from what is said above, that the indorsement of the Miners' Convention and of the legislature were both before the addition of the sweeping penal clause suggested by Mr. Berry. Telegraphic dispatches from Washington give the intimation that both Senator Felton and Mr. Caminetti are annoyed at the interference and delay and think it endangers the bill at this time. Be that as it may, the miners do not want the bill as it stands.

The fact is the miners do not ask or expect that the penal clause shall be cut out. If the word "must" in Section 9, is to remain, as appears probable, the penal clause is a logical sequence, and cannot be avoided. The miners of the State, and their association, strenuously object to Mr. Berry's penal clause adopted by the Committee of the Senate unless there is an amendment which omits mines not doing injury or damage to the rivers. They are anxious that provision should be made so that the Act shall not be so construed as to prohibit the carrying on of any mining operations prior to the construction of the proposed dams which can be conducted without material injury to the navigable streams or adjacent lands.

If the Senate will not agree to this just and simple proposal, the miners would at least like the operation of the penal clause to be suspended to some specified date when the commission shall have been organized and shall have made its examinations and plans, and be prepared to grant licenses to hydraulic miners. Under the present amendments, many miners now working legally and by permission of the courts (or at least without interference) would have to close down until the commission had prepared its plans and was ready to act on the petitions provided by the bills. This would apply to both large and small mines. Most of the restraining works now constructed have been inspected by the courts or antidebris agents and pronounced satisfactory. Unless the penal clause excepts such claims, they must shut down for a time (and that indefinite) after all the expense and trouble they have had to comply with the law.

The miners generally were prepared to accept the amendments offered by Senator Felton, with the exceptions noted in these resolutions adopted at their convention; but the broadness of this proposed penal clause, without reservation of any kind, is decidedly objectionable to the miners, since it practically puts those doing work legally in the position of offenders against the law. The Commission would take a year, and perhaps two years, to make the required examinations and formulate a general plan, and meantime everybody must wait. It is not asked that those not now working be omitted from the penal provision, but only that the mines now legally working be permitted to continue operations. There is nothing at all unreasonable in this request. The miners do not ask for any illegal mining to go on, but they do think that such mines as are doing no damage to the streams, and are impounding their debris, should not be compelled to quit work pending the action of the Commission. Judge Niles Searles has gone to Washington to present these points on behalf of the miners of California. If the necessary delay results in these modifications being adopted in the bill, it will be a good thing for the hydraulic-mining industry. If, however, it results, practically, in defeating the bill as it stands at present, why then, even that, in the opinion of many, may be a good thing for the hydraulic-mining industry of California.

THE Blue Jacket mine and mill in Elko county, Nevada, are advertised to be sold by the sheriff for a judgment of \$16,322.89. This property belonged to the estate of millionaire Blythe of San Francisco, over which there was a three-year lawsuit.

THE owners of the Hustler hydraulic mine (a mile east of Cherokee) were each fined \$100 for illegal hydraulic mining last week. The tailings from this mine flow into Shady creek.

THE wall shaft in a colliery at Pontypridd, near Aberdare, Wales, collapsed on Monday, and a number of miners were killed.

Coast Industrial Notes.

THE starch factory at Petaluma is nearly completed and in a few weeks will be ready for operations.

STEPS are being taken to put up a cannery at Visalia, Tulare county, and have it ready for operation by next June.

It is reported that new coalfields have been found in two localities 50 and 90 miles northeast of Flagstaff, A. T., and companies have been formed to work the six-foot veins.

THE old worn-out electric-lighting plant at Berkeley has been replaced by Mr. Osborne by an entirely new one with a guaranteed capacity of sixty-five arc lights of 2000 candle power each. Sixty new lamps will replace the present ones.

BADLAM Bros., of San Francisco, have completed their contract for a Peerless gas plant for the United States Government, and the arsenal and reservation buildings and grounds at Benicia are now brilliantly illuminated. The works are a success.

THE Session-Vandercook Company in Oakland, has begun placing poles in position on which to string the electric wires, preparatory to converting its Highland Park road into an electric line. The work of changing the line will be prosecuted with all haste.

OWING to an overstock, disagreements and competition, the members of the Lumber Dealers' Association in Los Angeles have fallen out. The price list has been suspended and every lumber dealer is for himself. Prices took a tumble on Tuesday, and all the dealers are cutting and underbidding each other.

A MEETING of the citizens of Fresno was held Tuesday to consider the Monterey and Fresno railroad project. Considerable interest was shown in the scheme, and \$20,000 of the \$75,000 asked by the projectors of the road was subscribed. A committee on subscription was appointed to solicit the remainder.

WORK on the long-distance telephone connecting Fresno and San Francisco commenced January 18th. This enterprise has been in contemplation some time, but its consummation is promised sooner than was expected. Provision will be made for local service through the thickly settled portion of the country through which the line will pass.

At a meeting of the Oakland Board of Public Works Tuesday the new schoolhouses which are about to be erected in Oakland were discussed. It was resolved that in the erection of the schoolhouses sandstone must be used for the foundation and other portions of the buildings. The clerk of the board was instructed to advertise for bids for furnishing the sandstone.

THIS session of Congress is expected to set apart a sufficient amount of money to enable the building of several structures at the Mare Island Navy Yard, for which plans have already been made, for the housing of a fine lot of tools that have been received for use in iron-shipbuilding. As soon as these tools are set up, the yard will be in a fair way of being properly equipped for this class of work.

AN act to provide for the establishment and maintenance of a training-ship for the instruction of the boys of California in nautical matters has been recommended by the Chamber of Commerce for passage by the legislature. The act calls for the State of California to appropriate the sum of \$100,000 therefor, and the authorizing of the Governor to procure from the Government a ship of suitable size and tonnage for the accommodation of 230 boys.

THERE is a probability that the new Board of Supervisors will be asked to fix new rates for the electric light companies in this city. The claim is made that the board has the same power over the electric light companies as it has over the gas and water corporations, and can regulate rates in the same way. Complaints charge that an electric light trust has been formed in this city, and that the rates are becoming too exorbitant and should be cut down by the supervisors.

DURING the year 1892 from the depot at Placerville, El Dorado county, there was shipped 5,113,655 pounds. One hundred and twenty-two cars, of 20,000 pounds each, and including 62 refrigerators, were loaded and dispatched with green fruit, without transshipment, to Eastern markets. There were, also, of dried fruits 7 carloads. Of wine grapes, 11 carloads. Of lumber, a large increase, 36 carloads. Of slate, for roofing, 60 carloads. Of miscellaneous fruits, in various quantities, 30 carloads.

A BILL of considerable importance has been introduced in the legislature by Raw, of El Dorado county, adding a section to the exercise of the right of eminent domain. It adds canals, ditches, flumes, aqueducts and pipes for supplying water for operating machinery for the purpose of generating electricity for the supplying of mines, quarries, railroads, tramways, mills and factories with electrical power, and also for supplying electricity to light mines, quarries, mills, factories and incorporated cities.

At the annual meeting of the board of directors of the Omnibus Cable Co., it was decided to increase the company's capital stock from 20,000 shares of the value of \$2,000,000 to 25,000 shares of the value of \$2,500,000. The increase of capital is for the purpose of paying for the North Beach and Mission line, purchased some time ago, and to form a consolidation with that line. It is said that should the new storage-hattery car prove successful, the purchased road, the track of which is not in very good condition, will be reconstructed very soon, making it one of the finest cross-town roads in town.

H. A. McCRAVEY, of the Lakeport *Avalanche*, Lake county, says: "We have been needing a railroad for a long time now, and I think we are about to get it. Three different companies have been figuring to run a road from either Pieta or Hopland, on the Donahue line, to Lakeport, via Highland Springs. The proposition has been for us as citizens to raise \$50,000 by subscriptions and they would build the road. The matter has been receiving our

attention for some little time. We have got \$30,000 raised, and there is no doubt that we will secure the remainder. The road will be about 25 miles long and will cost in round figures about \$350,000 besides the subsidy. It will be an electric road and will admirably suit the needs of the people. The line will go through Big Valley, one of the richest sections of northern California, a region of fine farms and orchards, and there will be much produce of this kind to carry out.

WORK has been commenced in Los Angeles on a large five-story brick building for the Cudahy Packing Co. buildings. When completed they will cover an acre of ground and will cost about \$150,000. The full capacity of the factory will be 500 hogs and 150 cattle per day, and when running in full force it will employ at least 200 men. It is estimated that the tributary territory south of Bakersfield now pays out annually for Eastern hog products nearly a million and a half dollars.

WORK on two of the tunnels between Santa Margarita and the town of San Luis Obispo is making good progress. The first tunnel south of Santa Margarita, which is the longest of the seven, being 3616.5 feet long, is now being bored at both ends. A day and a night force is at work and 430 feet of the tunnel is already completed. The work progresses at the rate of ten feet a day, so that it is calculated that it will be finished in 316 days from the time the first shovelful of dirt was moved. On the next tunnel only a day force is now at work.

R. C. McPHERSON, an oil expert, visited the Livermore (Alameda Co.) gas well this week, and is satisfied that there is a large body of oil to be found by boring. He could only estimate the necessary depth, as much would depend on the pressure of the body of gas and the chemical character of the surface penetrated. Some years ago an artesian well company bored down about 100 feet and found indications of asphaltum. Mr. Fowler states that the spring is in perfect line with the strata that intersects the coal mines that J. B. Treadwell is developing about ten miles from Livermore.

THE franchise for an electric railroad on Twelfth street, Oakland, is about to be utilized. The ties are now being laid on the street and work will be commenced at once. The original franchise was for a cable road, but permission was subsequently given to build an electric road. The line running to East Oakland along Twelfth street is about to be converted into an electric road in order to save it from ruin, and it is generally believed that the Grossmeyer franchise on Twelfth street west of Broadway has been purchased by the Southern Pacific Company, who will use it in connection with their East Oakland road, running through cars.

CLOSELY following on the recommendation of San Pedro as a site for the Government harbor comes the news that the Southern Pacific Company will soon begin work on an important improvement on its San Pedro line. The long trestle which crosses the Wilmington slough, between the two towns of Wilmington and San Pedro, is to be replaced by a solid embankment. Work will be commenced at once at filling up the trestle with stone and soil, and will be continued until the pile work is supplanted by a more solid foundation for tracks. The growing traffic of that branch and the age of the timbers in the trestle call for substantial improvement.

THE directors of the California Improvement Company are considering an important change, which will be made in the Oakland and Alameda street railway, now being equipped with electricity. One end of the road is at Seventh and Broadway, in Oakland, and after passing through Alameda the road terminates at Twenty-third avenue, in East Oakland. The directors will ask for a franchise through Oakland to connect the two ends, and cars will run around the circuit continuously in both directions. It has not been decided yet whether to make the road double track, but that will probably be done.

A MEETING of the Saratoga Improvement Company has been held to discuss the question of raising a subsidy for an electric road between San Jose and Saratoga, Santa Clara county. O. W. Wooska and G. Henry, of San Jose, offered to build the road providing local residents contributed \$50,000. The total cost is estimated at \$250,000 and the running expenses for the first year at \$45,000. It is thought no difficulty will be experienced in raising the required amount. Passenger trains will be run every hour, the fare to be 35 cents for the round trip and 25 cents per single trip. The road will ultimately reach Congress Springs and Los Gatos.

THE Builders' Exchange of Oakland has passed a resolution declaring that the best interests of the city demand that at least one practical mechanic shall be a member of the Board of Public Works. A request is therefore made that a competent builder be appointed when the first vacancy shall occur. The exchange announced that they will not support any candidate for Mayor who will not consent to make such an appointment should he be elected. Unless the builders are a very strong body politically, there is little chance of their desire being granted. Such positions are usually given to politicians, without much reference to their knowledge.

ARTICLES of incorporation of the Monterey and Fresno R. R. Co. have been filed with the county clerk of Fresno county. The articles state that the road is to pass through the counties of Monterey, San Benito and Fresno, and its length is to be about 150 miles. The principle office is to be in Fresno. A telegraph line is to be operated in connection with the road. The term of incorporation is 50 years. The capital is \$3,000,000, divided in 30,000 shares \$100 each. Of this amount \$150,000 is subscribed and 10 per cent paid up. J. C. White was elected treasurer of the company. Following are the directors for the first year: A. W. Jones of Kansas city, C. C. Walter of Fresno, Alex. Gordon of Fresno, H. A. Green of Monterey, W. C. Hill of Salinas, Wm. Palmatag of Hollister, Thomas Flint of Hollister. Work on the survey will begin at once, and it is thought that it can be finished in three or four months. Then the work of grading and building the

road is to begin. As soon as a few other arrangements shall be completed a mass meeting of the citizens of Fresno will be called to take vigorous action. It is considered now that the road will be pushed till Fresno is united with Monterey by rail. It is said that all arrangements have been made for selling the bonds of the road. The bonus which the counties have subscribed is not to be paid till 30 days after the road shall be in running order and in actual operation.

REPRESENTATIVE CAMINETTI of California has introduced in Congress a resolution directing the Secretary of War to cause to be made, under the supervision of the Chief of Engineers of the United States army, examinations or surveys, or both, of the navigable waters of the river system tributary to the bay of San Francisco, with the view to permanent improvement for the purposes of commerce and navigation, by means of levees or otherwise, so as to obtain the following depth: At low water, nine-foot depth to the city of Stockton, three feet to Hill's Ferry, seven feet to the city of Sacramento, three feet to a point near Chico, 30 inches to McIntosh Landing, 20 inches to Red Bluff, 30 inches to the city of Marysville, and to report the result thereof to Congress on or before November 1, 1893, with complete plans and details of the same, together with estimates of the cost.

INDICATIONS point to the establishment of a new railroad through the Santa Clara valley, to be owned and operated by the San Francisco and Santa Cruz Railroad Company. The company was originally formed for the purpose of building a railroad between Ravenswood and Gilroy, one from San Jose to Alviso, and one from San Jose to Saratoga. The first named road will be operated under the name of the San Francisco and Santa Clara Railroad, and the last two under the name of the San Francisco and San Jose Transportation Company. It is intended to connect Ravenswood with San Francisco by steamers. One of the promoters of the new road says that the details have all been arranged and that work will commence in a short time. He adds that the necessary equipments of the road have been contracted for and that some of the material is now on hand. Part of the road is expected to be in running order on May 1st next.

THE report of E. C. Prieber, Viticultural Commissioner of Napa county, has just been issued from the State Printing Office. When the last census was taken, Napa county reported 18,299 acres in vines. The present report shows a decrease to 16,651 acres. Of the 507 vineyards in the valley, 244 report phylloxera. The disease is now spread over 2246 acres. Whenever resistants have not been used, the death of the vines appears to be only a question of a short time. The reports of wine stock show that there are 5,000,000 gallons now in the valley. The commissioner stated that no remedy to prevent the spread of the disease had been discovered, and at only two of the entire number of vineyards visited was the disease being specially treated. As a rule, vineyardists have come to the conclusion that any special treatment is useless. The report states that some of the cellars are overstocked with wine of the vintage of four years ago, and prices are considerably below the figure desired.

W. J. EDBROOKE, supervising architect of the U. S. Treasury Department is inspecting the Government buildings on this coast. He will prepare the plans for the new postoffice in this city. He and Mr. Erygia accompanied by Lyman Bridges, J. C. Martin, Charles S. Chadbourne, Colonel W. D. Sanborn, Rudolph Herrold Jr. and Messrs. Duggan and Brady, visited Knowles & Hosmer's quarries at Raymond, Fresno county. Other quarries had been previously inspected with a view of ascertaining the quality of stone, ease of access and facility of transportation, and the Raymond Granite Company's quarry appears to offer the best inducements. The stone in sight promises well for blocks of any size being procured. Mr. Erygia says that there is one ledge alone 200 feet long and 10x10 square without a defect. Another ledge 230 feet long, 14 feet thick and 26 feet wide was noticed, so that blocks of any size or shape can be hewn from these quarries if necessary. In laying foundations, especially on ground of the nature of the postoffice site, huge blocks are often required.

At the last meeting of the Academy of Science there was a discussion on the subject of natural gas in the Sacramento valley. It was opened by Mr. Watts, a field agent of the State Mining Bureau. In his work for the bureau he has recently been at work in the Sacramento valley, and has visited and examined those wells which produce gas. As yet none of them produce in quantities to be practically useful, but there have been no wells bored specially for gas, and none of them have been properly cased to keep water out and allow the gas to rise to the surface freely. Gas is always found with a strong brine, almost as salt as sea water, and in wells which flow through brine the gas bubbles up and can be ignited, and there are a few instances of it exploding in wells when brought in contact with a flame. The gas is found in each of the groups of cretaceous rocks. It is accompanied by a strong smell of petroleum and in one or two places petroleum was found oozing from the rocks. The small quantity of gas found in the Sacramento valley is of a good quality for heating purposes, but no estimate of the pressure can be made until wells are drilled and cased to exclude water.

THE new association of the Alaska salmon cannerys includes about 36 canneries. The temporary combination of last year proved to be so practicable and was so successful that the majority of the large canners desire to continue the plan. Out of the thirty-six Alaska canneries all were shut down but nine, and these produced all the canned salmon which was demanded at a much less cost than had it been produced by all the canneries with the usual commercial competition. The intention of the combination is to can all of the salmon required by the market with economy and to control the output, so as not to flood the market and cause a low price to follow. The plan is to allow each canner a pro rata of stock on the basis of the

productive capacity and the apparent profit his cannery or canneries would have in the event of a good price ruling. At present the principal concerns on the outside are the Alaska Improvement Company and the Behring Sea Packing Company. They were not in the combination of last year, but reaped a benefit from the operations of the combine, as they did not cut prices. The new company has a capital of \$5,000,000. The output of salmon will be limited to 500,000 cans a year.

THE officials of the Southern Pacific Co. are taking steps to convert from a narrow to a broad gauge the line known as the Santa Cruz division, which runs from this city to Santa Cruz. All freight shipped from stations on the road to points on broad-gauge roads, or out of the State, has to be transferred from the small cars to the large ones, and the business has grown so great that the rehandling has proved a nuisance. The officials deny that any change will take place for many years to come, but the fact remains that many preparations are now being made to lay a third rail in order that broad-gauge freight trains may be run over the road. Work of laying a third rail from Alameda to Los Gatos, at the foot of the Santa Cruz mountains, is being carried on and the officials expect to have broad-gauge trains running between these points by next fall, that they may take out the large fruit crop without rehandling it. None of the many tunnels on the road are wide enough to admit of the passage of broad-gauge cars, and experiment is about to be made to ascertain the cost of enlarging the narrow-gauge tunnels. Lumber and timbers are now on the ground at Rincon, a point two and a half miles north of Santa Cruz, where there is a short tunnel and which was chosen as the best place to learn the cost of remodeling tunnels.

Personal.

MR. FELIX CHAPPELET went up to the Mayflower mine, Placer county, this week.

A. LEONARD, mining engineer, has gone to Chicago on very important mining business.

PROFESSOR SCHABERLE of the Lick Observatory left for Chile this week, where he will observe the eclipse of the sun in April. He will bring back a number of photographs.

THE Board of Regents of the State University of California have adopted a resolution detailing Professor Barnard of the Lick Observatory to make a tour of inspection among the leading observatories of Europe in the interests of astronomical science, and granting him six months' leave of absence, with pay, for that purpose.

ISRAEL LAWTON of Oakland has been appointed a member of a commission composed of representatives of several States to examine and test the weight and fineness of coins reserved at the several mints of the country during the last calendar year. Judge Lawton was formerly superintendent of the U. S. Branch Mint in this city.

GARDNER F. WILLIAMS, formerly of Oakland, is now general manager of the De Beers Consolidated Diamond Mines, at Kimberley, South Africa. He visited California last summer, and on his return to his post of duty was given a fine reception. The Diamond Fields Advertiser, in speaking of the occasion, says: "All the officers and many of the employees of these richest diamond mines in the world attended, and around the hall were hung such mottoes as 'Welcome to Kenilworth,' 'The Workingman's Friend' and 'Respect Cannot Be Bought.' After Mr. Williams had been welcomed by the chairman of the company, who paid a great tribute to his ability, the honored guest was handed an address beautifully illuminated and surrounded by a picture of Mr. Williams in a diamond on behalf of the employees. The recipient responded in a speech expressive of good-will toward his workmen." Mr. Williams is well-known in this State, where he resided for many years, and where he got his first practical mining experience. He was an especially skilled hydraulic miner, but quit that work when the debris troubles began.

Miners and Experts.

SAN FRANCISCO, Jan. 23, 1893.

TO THE EDITOR:—A short time ago an article appeared in the MINING AND SCIENTIFIC PRESS, signed "Mining Sharp," which proves very little, as it evidently exhibits personal bias. The party is no doubt right in what he says of the majority of miners; they are, as a rule, a cranky, unreasonable set, and have a remarkable facility for standing in their own light. Still, we could not do without them very well, as they are the pioneers in opening up mines and preparing properties for those who come after them. But with all the reason I for one have to complain of the class, give me the miner every time before the so-called expert that "Mining Sharp" seems to think so highly of. I will not deny an educated expert ought to be something of some use, but it is very hard to say for what. What expert ever found a mine? What expert has ever owned one? Men graduate from law and medical colleges, military academies and technical schools and become great lawyers, doctors, generals and mechanics, but who ever heard of a graduate from a mining school owning a great mine or becoming a millionaire from mining? I know well that Haggin, Tevis, Hayward, Hobart, Daly, Grayson and a host of others never got their millions out of any such institution. For one thing, they simply let the ordinary miner grub away till his prospect is opened sufficiently, when they purchase and develop it, and when it is ready for machinery call in the foundryman and set to work grinding out dividends—all without having an expert within a thousand miles of them. There might be one case in a million, but there is not a mine in this State, if on the coast, that owes its first origin, development and final triumph solely and individually to the man with a diploma. There was a time when California mines were salable in London, but the business is dead as a stone at present, and will never revive. I happen to know something of the deals that gave us our quietus. Since 1886 we have sold in

London the Valley Gold and the Victors in San Bernardino, the Union at San Andreas, the Glen in Calaveras, the Amador near Jackson and the Josephine, in Fresno, of fragrant memory. All these mines were "expert productions" of the first order, being passed on by local or foreign customers of that ilk. The Josephine "Mining Sharp" ought to roll about in a very ocean of sweetness. Here the mine was bonded by Expert No. 1 (one of the shining lights of the order) and sold to Expert No. 2 in London, who was the head of an expert organization there. No. 2 employed No. 3 and No. 4 of the local board to pass upon the mine, which was done favorably, and the mine floated with such eclat and success in London that a broker writing to me about that time said he had an order to get 100 shares, and such was the furor for the stock that he could only deliver 20. The mine was put up at 60,000 pounds, and went to 120,000, at which no doubt most of the shares were disposed of; but in a few months it turned out to be one of the most shameless fiascos ever put on the market.

I mention this case particularly because there was so much of that "expertism" about it, which mining sharps seem to admire so, and because it exhibits more clearly than any other what experts really amount to, as I do not believe there was a particle of dishonesty in this whole transaction, but incompetence, and nothing but incompetence from first to finish. I remember a party had a mine for sale at the time with a shaft almost 400 feet deep, maybe more, and two 400-foot drifts at the bottom in ore, which at one end was over 20 feet wide and showed no walls. This was taken to the principal Josephine expert, and, being a property of extraordinary merit, was of course sent a packing out of the door with the speed of lightning. This mine was soon afterward purchased by one of California's leading millionaires, and has now among other articles of equipment a ten-stamp mill from that very same Josephine mine, purchased when the machinery of the latter was scattered to the four winds by the auctioneer or sheriff. Could the irony of fate go further?

There are some roving mine promoters in the West, who have sold a couple of silver mines in the last two years, and as the sales have been successes, much credit ought to be given to the expert they employed. What does all this amount to? These promoters look very big, wise and important, hawk around till they come across some mine that not only has merit, but has a loog record, and is producing at the time being. What has the expert to do in this case but to report actual facts? As the facts are all in favor of the mine, how can he make a mistake? Here is a mine with a shaft 600 feet deep; four levels have been run in ore on each side of the shaft an average distance of say 500 feet; the vein is 30 feet wide, going 30 to 40 ounces in silver. Level No. 1 has been worked out and there are the books to show that for three or nine years the gross yield, expenses and profits have been so much. The expert appears on the field, fills himself to bursting from the foreman, under-foreman, miners and everybody else about the place from whom he can pick up a few crumbs, down to the logger and Chinaman. Then he gives it all off as his own, and, to still further enhance the importance of the production, it is padded out with a great many pages and columns of figures, copied from the company's books, as to the gross receipts and dividends referred to. The promoter who has a reputation as an expert himself, with a reckless daring that cannot be too highly reprehended, writes a little ten-lie "Me Too" report, which is appended to the main document and the whole is ready for general consumption. The mine being a good one is sold; it goes on doing, of course, what it always had been doing before the promoter had ever heard of it. The thermometer of enthusiasm keeps rising with every dividend till you have half of London ready to put up their last copper on the judgment of the promoter and his unapproachable assistant. I mention this case to show what this experting amounts to even in its most favorable aspect, where it is a so-called "success"; but even here I will wager if the mine had a shaft 1000 feet deep, if it had ten drifts therefrom, 1000 feet long; if the vein was 50 feet wide and went 100 ounces to the ton, it is all right; but if there was no mill on it, no past record, no present production, and the promoter and his expert were left all alone with it and the "rocks," as Mining Sharp puts it, I bet they would not know where they were. Verily, in mining matters, "Great is King Humbug," and the Lord Chancellor of this court is the "Mining Expert."

AMADOR.

The Best Deposits of Tin.

The mineral resources of the Indian or Malay Archipelago are known to be very great, but up to the present systematic mining operations have been confined to the wonderfully rich and pure stanniferous deposits of the islands of Banca and Billiton. The tin obtained from the ores found in this part of the globe is the most unsophisticated produced. A recent analysis of Banca metal gave the following results:—Tin, 99.961 per cent; iron, 0.019; lead, 0.014; copper, 0.006. According to the latest statistics available, there are in the island of Banca some 200 mines worked by private companies, while about one-half that number is exploited by the Dutch Government. The island itself is divided into nine mining districts. The miners are members of the Kongsis or Chinese trade-unions, which effect the labor contracts with the Government. The cost of production in the last fiscal period amounted to 26.14 Dutch florins per picul, a weight of approximately 135 pounds. The sale price attained an average price of 84.82 Dutch florins, so that by a total output of 65,964 piculs a net profit of 2,805,000 gulden, or £233,750, accrued to the government of the Netherlands. The mines on the island of Billiton are in the possession of a private concern. This organization pays a royalty to the Government of 3 per cent of the gross annual yield. In the preceding financial year the authorities received under this agreement 2,376 piculs, out of a total of 76,183 piculs, a quantity which realized on sale about £17,000. The mining board which controls the Government works is an offshoot of the Dutch ministry of commerce, and it consists of 15 engineers and 24 overseers.

School-Bred Miners and Practical Men.

REDDING, SHASTA CO., Jan. 21, 1893.

TO THE EDITOR:—At variable periods the PRESS is regaled with an article written by some sorrowful soul, who is generally one who speaks from his own sad experience, and if we follow his course back a little ways, our sympathy may be aroused and we may feel like saying: "He's a good fellow; pity he can't make things stick." Such a one sends up the usual wail, over the non de plume of "Mining Sharp," in your issue of Jan. 7th. Such articles are never written by the progressive, successful man. "Sharp" feels hurt at the wrong-headedness of mineowners who persist in calling in the services of practical men instead of the "professionally, scientifically educated engineer." No doubt the business world, keen and generally unerring in its instinct, has learned to shun the school-bred miner. It has seen the wrecks of fortunes, ventured upon the well-paid reports of the highest professional authorities, scattered all over the land. From the days of the Fremont estate in the early fifties to the Bears' Nest fiasco in 1890, the track of the professionally, scientifically educated mining engineer has been one of ruin.

It may be questioned how far the term science is applicable to knowledge of mining. I feel pretty certain that there is no science of mines. No one has yet demonstrated how metalliferous veins are formed, nor the source of the mineral aggregates which form the veins, nor the method of their deposition. There are plenty of geological hypotheses but no geological science extending so far. There is no known law controlling the form or extent of metalliferous deposits, either horizontally or in depth, or limiting the bounds either of age or of rock within which they may be found. So long as we are ignorant of the law, we cannot formulate a science. Therefore, the term scientifically educated is so far a misnomer.

In the field of the unknown all are equal. It is true that many of the methods of procedure used in mining art are scientific operations. Thus, if we want a set of plans of a mine, we call in a surveyor who does the work accurately by processes which are thoroughly scientific, even though he may have no idea of what part of the work is mine or what is common country, or never had seen a mine before.

If we want to know the composition of any material encountered, we give a sample to the chemist, and he determines its chemical composition without any regard to whether it came from a mine or not.

The metallurgist takes the product of the mine and reduces the metals from the ores, even if he has never seen a mine in his life.

These scientific operations are accessories of the art, but they are not necessarily any part of it. In other words, they can exist in places where there are no mines and be operated by men who have no knowledge of mines, or a man may have the highest education possible to be attained in all three of those pursuits and still be utterly ignorant of what constitutes a mine.

How can the art of the mining expert be taught? There is no royal road to it except through the hard ways of experience; only by active, intelligent work and observation in the mines can the secrets be wrung from the unyielding rocks; only by close contact with nature as she unfolds her story, which awakens within us the perceptive faculties and by long-continued use disciplines the judgment, can we place a correct interpretation upon indications which often, more than the developments actually made, pronounce the value and extent of the mine.

The mining expert is he who, by long experience in the mines, under all the various conditions of time and place, has preserved the partnership of an intelligent brain with indefatigable industry of hand; who, with an innate love for his art, has had his perceptive faculties awakened so that he is able to trace the lines drawn by nature's hand, and interpret them aright. Fortunate is he if also he can interpret his thoughts with clearness and grace, and paint in words of vivid truthfulness the story of the rocks. Too often, indeed, the practical man is unable to express himself in the language which will convey the truth in the most pleasing manner, and here he is at a disadvantage with the school man. But he has sweet revenge. Of late years the majority of the men sent to examine mines for the big mining firms are men who do not refer to college experiences to any great extent in their conversations. It is a case of the survival of the fittest. J. H. MORTON.

Obstacles to the Sale of Mines.

SAN FRANCISCO, Jan. 23, 1893.

TO THE EDITOR:—In a former communication I expressed my views very freely on the subject of exaggerations in mining reports. I think something might be said of the mystery preserved by mineowners as to the past and present product of a mine for sale. There seems to be a disposition to hide all facts relative to this important information from the purchaser. It is simply folly to attempt to hide the real condition of the mine from the expert who will be sent to examine it, when the facts must come out, of the productiveness of the mine, inasmuch as assays of the rock determine its value, and the cost of mining and milling is easily determined when all the merits and demerits of the mine can be arrived at.

Many mines are run in a very slipshod manner, no record of product and expenses being correctly kept, and when the owner offers his mine for sale, the first question asked is, "What are you producing?" The absence of any record at once casts a suspicion on the merits of the property, while a record and correct account of product and expenses would be calculated to inspire confidence to say nothing of its being more business-like.

Another obstacle in the way of the sale of a mine, is the refusal of owners to give the necessary time to the middle-man to find a customer for it. The broker can hardly af-

ford to give his time and efforts in seeking the capital to accomplish the sale, on the uncertainty of being able to obtain the property when he has found the customer, as in case of any improvement in the mine the price may be advanced; again, parties contemplating the purchase, will not spend their time in an investigation or go to the expense of sending an expert to inspect a mine on any such uncertainty. The broker must exhibit his evidence of authority to sell before he can obtain the attention of capitalists.

It is a peculiarity and characteristic of the mineowner who has waited for a purchaser for years, when finally, there seems to be a possibility of a sale, he at once imposes conditions and restricts the time for the transaction in such a period as to defeat the chance of a sale. He demands immediate action and limits the time for the first cash payment to a date so near at hand that the parties decline to undertake the investigation; or he wants a deposit on a bond, if given. Such conditions have lost the sale of many mines, when the policy would be to give the utmost period of time he can, unless, indeed, he has a prospect of sale from another source.

It may be urged that it is unwise to tie up the property for months without some compensation and the argument is used that a bond without a penalty involves no responsibility on the part of the broker. He may sell or he may not; but it should be borne in mind that the broker loses his time and labor in the effort in case of failure to sell, with no compensation therefor; at any rate the mineowner must make concessions if he wants to sell his property, and he may decline to give a bond if he has little or no faith in the broker; that is his privilege. To give a bond on a mine has its objections, it is true, but it seems to be an almost imperative necessity and one of the chances that the mineowner must take if he is desirous of selling. If not, then he can be more independent, but his opportunities for a sale will doubtless be greatly lessened. MINING SHARP.

Cyanide Notes.

"Cyanide is King" is to be the legend inscribed on the base of the monument erected in the Kimberley (South Africa) Exhibition Hall, to convey some idea of the magnitude of the Witwatersrand output, and the title would appear to be well-merited. In a recent report of the African Gold Recovery Company, who use the MacArthur-Forrest process, it was shown that the gold recovered by the process, in proportion to the total output of the Rand, has increased from 7½ per cent. in November, 1891, to 12 per cent. in March, 1892, and 15 per cent. in June. The August return gives 16,392 ozs. out of a total of 102,322 ozs., being equal to 16 per cent., and the September return is still larger. Many of the companies are retaining their tailings until they are able to erect their own cyanide works, and even granted that not another stamp is erected for the next six months, within the period there will be an appreciable augmentation in the yields.

The gold output of the Witwatersrand mines for September reached the magnificent total of 107,851 ozs., or 5,529 ozs. in advance of the yield for the previous month and 4,501 ozs. over June, when the previous record of 103,350 ozs. was established. The yield for September, 1891, was 65,601 ozs., and the figures have since gone up and up as follows: October, 72,793 ozs.; November, 73,393 ozs.; December, 80,312 ozs.; January, 84,560 ozs.; February, 86,649 ozs.; March, 93,244 ozs.; April, 95,562 ozs.; May, 99,436 ozs.; June, 102,350 ozs.; July, 101,279 ozs.; August, 102,322 ozs.; September, 107,851 ozs. In September the Robinson produced 11,400 ozs. from its own ground, and 1,911¼ ozs. from bought concentrates. The Langlaate Estate yield was 9,308 ozs.; the Crown Reef, 6,384 ozs., and the New Primrose, 6,055 ozs. Five companies have exceeded 3,000 ozs., viz., Geldenhuis Estate, 5,223 ozs.; Ferreira, 3,936½ ozs.; Nigel, 3,870 ozs.; Simmer and Jack, 3,409 ozs., and City and Suburban, 3,210 ozs. Twenty-three companies produce between one and 3,000 ozs. In the nine completed months of the present year the yield has reached the fine total of 873,245 ozs., giving a value, in round figures, taking £3 10s. as the average price, of £3,060,000. In all probability, it is stated, the output from the Rand for the next year will reach a value of £5,000,000, or about \$25,000,000.

A dispatch from Ward, Colo., dated January 5th says: The Cyanide mill of the Puzzler company is working smoothly and giving great satisfaction. About 15 tons of ore is being milled each day, and Supt. S. C. Houck claims to be saving from 92 to 98 per cent. of the actual value of the ore. The capacity of the mill will soon be increased. The MacArthur-Forrest process is finding great favor in Boulder county, and now mills are being talked of by the score. The great Ballarat mine, located in Ballarat Gulch, will erect a one-hundred ton mill on their property in the immediate future. This process will revolutionize mining in Boulder county during the present year.

The Forfeited Railroad Grant.

The railroad lands belonging to the Southern Pacific Company in the southern part of the State, which were declared forfeited to the National Government by a recent decision of the United States Supreme Court, have been officially described or designated as follows:

The grant includes all unoccupied Government land lying 30 miles on each side of the railroad track from the ocean shore at San Buenaventura to Los Angeles. It then continues along for 30 miles each side of the surveys from Los Angeles through the county of San Bernardino to the Colorado river at The Needles. A Los Angeles expert, who had made a specialty of investigating these lands, states that "there are none fairer in the southern part of the State." These lands embraced within the grant, which are designated as being "desert waste," are susceptible of the highest cultivation. The Wright irrigation district, which lies contiguous to part of the forfeited grant, fur-

nishes an illustration of the productive capacity of these lands. In Ventura county all the available valley lands have been sold. In the mountainous districts, however, there are thousands of acres worth taking up. In Los Angeles county, in the northwestern part, there are but few acres of any value remaining, and the same state of things exists until within a few miles of the bounds of San Bernardino county is reached. From there to the Needles plenty of vacant tracts can be had for the taking up.

Scrap Iron and Copper.

When the Anaconda and St. Lawrence mines were opened up in Butte it was found that the water contained in the fissures was strongly impregnated with copper in solution—so much so that iron cages, cars and tools of all kinds were quickly destroyed by the affinity of the copper for the iron. And that is the case to-day. Only a few weeks' immersion in the waters reduces a mass of iron to pulp, and this requires that all material used in the mine composed of iron and steel be replaced at frequent intervals. After three or four weeks' constant use in the mines, a cage or car is found to be pitted like the inner bark of a tree after an attack by insects. The water of the St. Lawrence mine is pumped out and flows across East Broadway down into the valley. For a long time this water went to waste, as no method was known of extracting the copper from it. After awhile, however, a discovery was made that is being utilized to good advantage.

Some tin cans found their way into the small stream, perhaps through the medium of boys at play. In a short time it was noticed that the cans had every appearance of being made of pure copper, so thickly were they coated with that metal. These were regarded as curiosities by all who saw them, but presently they attracted the attention of a man who saw a little further than most people. His name was Miller, and he began to experiment and found that old cans and iron junk thrown into the water were soon destroyed, and in their stead was a rich deposit of copper. He had an idea that it would pay to extract the copper from the water by this process, and immediately purchased the exclusive right to the water for a small sum of money.

Then he put in a series of reservoirs and tanks along the little gully where the water ran. These he filled with all the old refuse metal to be had in the town, including barrel hoops. In the course of about six months he made a clean-up and found that the old junk was totally destroyed, but in its place was a sedimentary deposit in the bottom of the reservoir and tanks assaying 80 per cent copper. He then enlarged his plant somewhat, and is now deriving a handsome revenue from this peculiar mine. His annual income is estimated at from \$10,000 to \$15,000. All the labor necessary is in cleaning up and charging the batteries of the reservoirs.—Butte Inter-Mountain.

A New Refining Process.

In these days of low prices for silver bullion and other products of silver mines, it behooves the owners to look out for cheaper methods of reduction and for appliances that will reduce the cost of preparing their product for market. The Ontario Company is alive to all such features, and recognizing the slowness and the cost per ounce of refining Marsac sulphides by the Stedefeldt process, has decided to make a complete change and substitute a new method recently patented by Mr. F. P. Dewey, and arrangements are now being made for all alterations necessary in changing from one process to the other. Mr. Dewey is in the city and was interviewed by a representative of the *Record*, who obtained the following information concerning the new process: The patent is owned by the Dewey-Walter Refining Co., all the members of which reside in Washington, D. C. The letters patent have not as yet been issued owing to one or two slight conflicts in the Patent Office, but no trouble is anticipated as to final results. The process is much shorter and cheaper than any other now in use, and the metal requires less handling. Silver is refined to 9.98 and gold to 9.90, both of which are fully up to the requirements of the Government mints, hence the product will not have to be re-handled by the Government or other purchasers. The process makes a complete separation of the gold, silver and copper, the latter appearing in the form of bluestone, an article used in the Russell leaching process. The method employed is known as a wet process, and does away with the matting and roasting furnaces of the Stedefeldt plan. Mr. Dewey has taken a contract to reduce all the Marsac sulphides to bullion at the uniform rate of 1½ cents per ounce of bullion produced, and will commence on this year's product of sulphides. The Stedefeldt process will be operated until the product for 1892 has been reduced to bullion, when the present appliances will be torn out and the Dewey appliances placed. The building will not be enlarged unless it is decided to put in a new melting plant, and that may be done to save cost of hauling bullion to and from the Ontario mill, where the melting is now done. It is expected that the tearing out of the old and the placing of the new appliances will commence in about two weeks. Mr. Dewey will remain in the city until the new plant is in thorough working order. Should the plant prove successful, and Mr. Dewey knows it will, it will be placed in the new Ontario mill when that is completed.—Park (Utah) Record.

PROFITS OF COPPER-MINING.—The Calumet and Hecla, the great copper mine, has declared \$2,000,000 in dividends for the present year, this making a total dividend paid to date of \$38,850,000. Assessments have been levied to the amount of \$1,200,000, and the capital stock is \$2,500,000. To those who have held the stock from the time the mine first began to yield a profit, the gain has been enormous, but there are comparatively few shares so held. Much of the stock has been purchased at a high figure, and upon its present selling price it pays only about 7 per cent.

There have been some difficulties in placing the bonds of many of these districts.

The securities provided are new, and capital is always conservative and fearful of new schemes. The need of a canal and irrigation works in any district indicates *prima facie* the aridity of that district, with a consequent lack of population in its vicinity. Capitalists want the most ample immediate security for their loans, and are not willing to invest on prospective improvements and a consequent advance in value. This is especially true of eastern capitalists who have not yet overcome their early prejudice against the great American desert.

The advantages offered by the Wright law, however, are amply illustrated by the fact that, in some cases, communities with ample and well-secured water rights, owning paying, and improved farms and orchards, have organized under its provisions in order that they may avail themselves of its benefits in working as a unit instead of as individuals.

ADVANTAGES OF IRRIGATION.

The effect of water upon land may be classed under two general heads—chemical and physical.

The chemical effects may again be divided into:

1. Supplying fertilizing qualities, contained in the water, to the soil.
2. Changing the chemical composition of the plant food already existing in the soil.
3. Dissolving and preparing the plant food of the soil and fitting it for absorption and assimilation.
4. The deposition of beneficial or injurious salts.

The physical effects are fewer but no less important, and are—

1. The softening of hard soils and rendering them suitable for working.
2. The disintegrating of the harder particles and making the texture of the soil finer.

The matter of fertilization is one of the gravest importance to the Eastern farmer. The continual cropping of the soil has so deprived it of the constituent elements of plant life as to have rendered, in some cases, land worthless that was valuable until such continual cropping without making any returns had rendered the soil barren; in other cases, the farmer has to return a very large percentage of his earnings to the soil in the way of artificial fertilizers, in order to supply the necessary plant elements. While it is unquestionably true that we in California shall have to supply some portion of these elements, the water from our mountains, and even from our artesian wells, is so freighted with the larger part of them as to reduce the cost of this requirement to a minimum.

These constituent elements, which are drawn from the soil and absorbed from the air, are potash, soda, lime, magnesia, brown oxide of magnesia, iron oxide, alumina, phosphoric acid, sulphuric acid, silica, chlorine. These are usually found in abundance in all virgin soils, but continual cropping without returns in some form will ultimately exhaust them, and as a result, crops are light and unprofitable.

Our irrigating water is generally derived from the mountains. It falls in winter as rain and snow, follows the surface of the land to the main channels, and gathers up on its way all these elements, or it penetrates the soil, washes down the rocks, and breaks forth in the spring, and finds its way to the main stream. In either case the necessary elements of plant life are gathered up, held in solution and are ready for deposition on the soil to which the water finally finds its way. In the gathering of these fertilizers the water is aided by the heavy frosts of the mountain regions, which work continually, disintegrating the rocks and pulverizing the rich mountain soil, releasing all the elements required by plant life, which the water in its turn gathers up and carries on their life-giving mission.

The duty of water in irrigation is to supply the sap, and to carry with it the necessary food which the soil contains or which the water brings in solution, and thus forms the plant and the fruit. This it does by dissolving the plant food of the soil in which the plant is growing, changing its chemical composition and forming it anew in such shape that the plant can absorb and assimilate it. Coming charged, as they do, with so large a part of these necessary qualities, and finding others in the soil itself, our irrigating waters are supplied with perfect conditions, and, in that wonderful laboratory—the tree or plant—converts these elements into fruits or grain or flowers, as desired. And it is largely to these qualities of our water and soil that California owes its advantages as a fruit-producer.

Besides the great saving in the outlay for fertilizers, and the greater productive power of his land, the farmer or fruitgrower in the irrigated region has other great advantages over his brother in the rain belt.

He has no fear from the effects of drought.

He has learned to overcome all danger from this source. Here every year is a drought year, but with irrigation the effects of drought are rendered nugatory and every year is made a year of full and abundant crops.

OUR ARID LANDS.

Irrigation has within a very few years assumed a position of importance that few would have dreamed of 30 years ago. The first efforts made in this direction were by the Mormons who, arriving in Salt Lake valley in 1847, found a large basin of most fertile soil producing nothing but sagebrush, while the mountains rushed perennial streams on their way to the lake. Irrigation was a matter of necessity with them, and locating on these streams they diverted the water to the land and the results were surprising. The yield of wheat and corn and vegetables was enormous. While the system of irrigation introduced by the Mormons was crude, it served to show what arid lands would do when under water, and the great boast of this people was that they had "made the desert blossom as the rose."

The steady increase of population in the East, the absorption of all available Government lands within the limits of the rain belt, had a tendency to push population into the arid district, and gradually irrigation has obtained a foothold until it has grown to proportions that are surprising, and now, instead of speaking of the great American desert, we allude to the great West as the irrigation empire. This empire includes all of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North and South Dakota, Utah and Wyoming, and large sections of Kansas, Nebraska, Oregon and Texas, with over 7,000,000 people dependent upon it for homes and food. The importance of this subject first made itself appreciated in Congress as late as 1874-5 when the first inquiry into it was ordered made, and an examination of the San Joaquin valley, with a view to its reclamation by irrigation, was made by Government agents. Ten years elapsed before it received further recognition, at which time attention was again called to it by the arrival of an Australian Royal Commission to investigate our irrigable area and methods, when the Department of Agriculture detailed Richard J. Hinton to prepare a report on "Irrigation in the United States." Three years after this Congress provided for an irrigation survey under direction of the United States Geological Survey, and their inquiry into the condition of the arid lands was ordered by the Senate, having in view their possible reclamation by irrigation.

The rapid growth of irrigation is shown by the fact that when the first report was completed in 1886, the area of land reported as reclaimed by irrigation was 5,500,000 acres, a large proportion of which was used for pasture and the growth of natural grasses. In 1891 the total area under ditch is given at 17,086,034 acres.

The following table for 1891, given in the report of the Office of Irrigation Inquiry at Washington, will show how this area is distributed:

States and Territories.	Estimated Under Ditch.	Area Under Cultivation 1891.
Arizona.....	880,000	315,000
California.....	4,600,000	3,650,000
Colorado.....	3,007,050	1,800,000
Idaho.....	1,300,000	330,000
Kansas (west of 97 long.).....	900,000	120,000
Montana.....	1,250,000	410,000
Nebraska.....	200,000	40,000
Nevada.....	150,000	75,000
New Mexico.....	700,000	465,000
North Dakota.....	2,500	2,000
Oregon.....	125,000	45,000
South Dakota.....	100,000	54,000
Texas.....	1,500,000	160,000
Utah.....	735,000	423,000
Washington.....	175,000	75,000
Wyoming.....	3,031,484	185,000
Totals.....	17,086,034	8,049,000

From this table it will be seen that California leads in the quantity of land under irrigation systems and in the amount of that land now under cultivation.

Taking the area still open to settlement in the arid regions, as soon as the water which is now going to waste is properly preserved and we have an empire capable of supporting an enormous population. The States which come within this irrigating area are:

	Acres.	Sq. Miles.
California.....	100,992,640	157,501
Oregon.....	60,975,360	95,274
Utah.....	54,380,800	84,970
Washington.....	44,769,160	69,994
New Mexico.....	77,683,640	121,201
Nevada.....	71,737,600	112,090
Arizona.....	72,906,240	150,932
Colorado.....	66,830,000	104,600
Wyoming.....	62,646,120	97,883
Idaho.....	55,228,160	85,294
Montana.....	92,016,640	143,776

To this add 100,000 square miles, or 64,000,000 of northern and western Texas, and

the whole of Kansas and Nebraska west of 97 long., and some idea of the area and importance of our irrigation empire can be formed, and it serves also to show the importance and necessity of governmental aid in its reclamation. Within the arid region there is now a population of 7,000,000 souls. This number is rapidly increasing, and from estimates made by the office of Irrigation Inquiry, \$64,000,000 have been expended in irrigating works, as follows:

Under ditch the acreage given represents (at service of 250 acres per mile) a total ditch length of.....	Miles.
Total of actual expenditures (not of capitalization) for the mileage given at an estimate of \$3 per acre will be.....	Cost.
Allowing actual expenditures for other works, not under ditch mileage, and its necessary appurtenances, we may estimate the total at about.....	\$55,699,321
	\$64,000,000

These figures are certainly conservative, and the actual expenditures for irrigating works will probably far exceed them. Enough, however, is shown in the way of population, capital invested, and area to be reclaimed, to show the necessity for extensive Government aid in this important work.

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Transmitting Strength of Shafting.

It is generally pretty well known, says the *Scientific Machinist*, that a shaft will transmit power in proportion to its running velocity and therefore the faster a shaft runs the lighter it should be within reasonable limit. The use of extremely heavy shafting is not advisable under any circumstances, unless actually needed to perform the work required. Some imagine, says the *Mechanical News*, that a large shaft affording a very strong margin of safety, is the most economical to use; that, however, cannot be considered a logical and tenable mechanical position, unless tempered with sound judgment and much wisdom, sufficient of both to select properly. That there should be an ample margin of strength no one will attempt to deny, but shafting multiplies in strength so rapidly as sizes increase, that the unlightened are apt to make the selections much too large when aiming at only ample strength margin. To show how easily uninformed mechanics may make mistakes of that kind, it is only necessary to say that a three-inch shaft has nearly three and a half times the transmitting strength of a two-inch shaft. None unaware of the fact would ever guess at that difference and may fall into the error of selecting a three-inch shaft to safely do the work of a two-inch. To more favorably illustrate the difference, it can be stated that a two-inch shaft, properly sustained with bearings at reasonable intervals, will safely transmit 20 horsepower at 100 revolutions per minute and at the same time resist the transverse strain due to weight of pulleys and the pull of belts necessary for transmitting that much power. Under like circumstances and equally proportionate conditions, a three-inch shaft will just as safely transmit 68 horsepower at 100 revolutions per minute. Shafting should never be so large as to make it absolutely rigid; on the contrary, it should be to a fair degree elastic, with an ability to give and take between the power and the work. When too rigid, unless away above all requirements in size and strength, the liability to break is increased, especially if the work is of an abrupt and severe character. Long lines of shafting having the power at one end and the work at the other, should be graduated in size; the work end being of a size required to safely do the work and the power end larger, in proportion to the length of the shaft or the distance between power and work. If such shafts be of the same size the entire length, and that a fair working size only, there will be too much elasticity in the aggregate, which will tend to gradually weaken, distort, and, in the end, destroy the usefulness of the shaft.

Electric Heating.

Exploiters of electric heating apparatus are now beginning to have experiences similar to those undergone by the electric light pioneer. In the early days the canvasser for central stations had to combat the gas man and sell his product at a higher price. It seemed to many in those days that it would be an impossibility to make any serious inroads in the territory occupied by an illuminant so comparatively cheap and long tried as gas. But when one takes a retrospective view of the progress made and studies the difficulties that were overcome, the secret of electricity's success becomes evident. In a word, no one would now venture to assert that the incandescent lamp was not in every way superior to gas; and it is, too, in one sense a more expensive illuminant. Electric light is now the best artificial light obtainable, and it is for this reason that so many demand it in preference to gas. It is this superiority, therefore, of the electric lamp over its rival, gas, that secured its general adoption.

As it was with the incandescent lamp, so, apparently, it will be with the electric heater. The same ground, doubtless, will have to be gone over. The cries of "uneconomical," "too expensive," "a luxury," etc., are already beginning to be heard. But this time the electric heating pioneer has a good precedent to employ in his arguments—in fact he has two precedents, for applications of the electric motor furnish also most excellent illustrations of the benefits to be derived through the employment of an apparatus that does not make necessary the consumption of fuel at the point of service. Almost every day marks a new application of the electric heater under circumstances where, say, steam heat is not easily obtainable or the ordinary stove desirable. For instance, the electric heater has found its way into the conservatory, and the latest and most novel suggestion is that through the use of a

special form of heater, electricity be employed in the hospital to heat the poultice and warm the sick man's bed.

There is no doubt that the electric heater has come to stay. For a time, though, it will be employed in special lines of service. But its field of usefulness will unquestionably be a rapidly broadening one.

Welding Nickel and Steel.

At the October meeting of the Engineers' Society of Western Pennsylvania, Mr. Joseph H. Eastwick read a paper on the "World's Supply of Nickel." He mentioned the nickel deposits at various places in the United States which may be valuable, principally in Oregon, Nevada and North Carolina. A trial of the North Carolina ore by Mr. Mixer, of the Edgar Thompson Steel Works, was rather discouraging. It averaged about two per cent of nickel, although samples have been obtained running up to ten per cent. The Nevada ores are abundant in quantity and comparatively rich, but they are arsenious of nickel and difficult to refine. They are also far from railroad facilities. The Oregon ores are of the silicate class and have not been developed in commercial quantities.

During the discussion the question of welding nickel and iron was brought up. Mr. Mixer said that he had examined rolled sheets made in Cleveland, O., of nickel and steel. Looking at the edges of the sheet, it could not be determined where the nickel ends and the steel begins, but of course the outside is mostly nickel and the inside steel. The nickel is welded to both sides of a sheet of steel. It makes a non-oxidizable article having the stiffness of ordinary steel, and convenient for various uses.

Mr. Mixer pointed out that the small percentage of nickel used in steel is not likely to increase the demand for nickel so much as is generally thought. The Edgar Thompson people had received from Commodore Folger a bar of nickel steel containing 25 per cent of nickel. It was about two inches in diameter and very tough, and a steel chisel was ruined trying to cut through it. It took a beautiful polish. It is obvious that for many purposes a steel with a high percentage of nickel may prove very valuable.

SINKING PILES WITH WATER JETS.—*Genie Civil* thus describes the sinking of iron piles in Chili with a water-jet: Some of the piles were 14.76 inches in diameter, with a flat bottom-flange or pedestal 41.92 inches in diameter, and were sunk to a depth of 28 feet below the bottom of the river through very coarse, compact sand, in which screw piles penetrated with great difficulty, and sharp piles could only be driven from 11.8 to 14.1 feet. A pump delivering about 12,000 gallons per hour through a 4.92 inch pipe would sink two piles, each having a 2.05-inch pipe projecting about 7.87 inches below its base with a 5.9-inch opening. The pile being put in position and the water-jet started, it sank nearly three feet by its own weight, after which it is worked down by means of an endless cable leading from the drum of a hoisting-engine around a horizontal pulley bolted on to the pile so as to revolve the latter about its vertical axis. An average of 18 hours was required to sink each pile. On one side of the river a double-action Worthington pump was used, and on the other a Tangye pump.

MACHINE TOOLS.—In no branch of the applied arts, says the *American Machinist*, has greater skill been shown than in the construction of machine tools. In no country in the world has that skill shown a greater development than in America. It does not follow from this that we say make better machine tools than are made elsewhere, but it is a fact that no tools have been copied so extensively in foreign countries as American tools have been copied. This may not be much to say, but it does follow from this that we are doing work here which is favorably thought of elsewhere. American manufacturers are sometimes slightly jealous of the copying of their tools in foreign countries. We think that it is a credit to them that they are so copied. We are always glad to know that somebody somewhere in Europe is trying to produce a tool as made in America, and at the same time we have little fear that they will be able to beat the American manufacturer on his own ground.

OUR production of pig iron for 1892 was not far from 9,140,000 gross tons (actually 9,138,826 tons), the largest production, with the exception of 1890, in our history. In 1891 our production was 8,279,870 gross tons. This indicates a production in 1892 but little less (some 50,000 to 60,000 tons) than in 1890, and over 800,000 tons more than in 1891.

Scientific Progress.

The Conductivity of Insulating Bodies.

The effect of the physical condition of substances upon their dielectric properties is one that is deserving of more study than it seems to have received. In the *Philosophical Magazine* M. Edward Branley, M. D., calls attention to the fact that very thin fibers of insulating bodies seem to become conducting, and that good conducting material opposes great resistance to the passage of a current when inserted in its path in a pulverulent condition. Thus far there is nothing in his statements that might not have been arrived at by *a priori* reasoning; but that the conductivity of the pulverulent mass may be measurably restored by the discharge of a Leyden jar in the vicinity and destroyed again by a slight mechanical shock, while not new, could scarcely have been anticipated by theory. The phenomena having been demonstrated, however, one or two theories at once suggest themselves as plausible explanations of their cause. There are one or two other phenomena of thin fibers or pulverulent dielectrics, however, whose explanation is not so obvious. For instance, if the two ends of a circuit be varnished with shellac, and after the latter is thoroughly dry be brought into intimate contact, the insulation against low potentials is practically perfect. But place this junction in an atmosphere of pure hydrogen gas, the resistance is gradually lowered until comparatively good conductivity is established, only to be destroyed again equally gradually when the hydrogen is removed.

Neither mechanical shocks nor moderate increase of temperature seem to have any perceptible effect upon the rise or subsidence of conductivity. But if the treatment with hydrogen be repeated after complete resumption of the insulating state in air, the junction cannot be restored to the same degree of conductivity it was made to assume in the first instance, and the effect of the hydrogen gradually decreases with each subsequent application, until it seems to disappear entirely. Carbonic oxide and artificial marsh gas produce the same effect, though to a less degree, while natural marsh gas seems to be inert. The presence of carbonic acid, nitrogen, oxygen or other electro-negative gases, even in considerable proportion with the hydrogen, seem to have no effect upon the phenomena except what might be reasonably attributable to the dilution caused by their presence. On the other hand, if finely-pulverized hard glass be imbedded in the two ends of the circuit and they be brought together again as before, and hydrogen applied, a much higher conductivity will be attained than in the case where shellac was the dielectric, but it will not be assumed gradually as before, but in a series of impulses each succeeded by a non-conducting state, these electric impulses becoming more and more frequent until the current finally passes continuously with nearly the same freedom as it would were the conductor unbroken. On removing the hydrogen, the junction remains conducting much longer than where shellac is used, but loses its conductivity completely and instantaneously. Thus many substances have been tried with similar results, but differing in degree. But the manner of assuming conductivity and of losing it again seems to differ with each, and to be in a measure characteristic of the substance employed. A satisfactory explanation of these phenomena has not yet been suggested.—*Electrical World*.

Electrification of the Steam Jet.

At a recent meeting of the Royal Society, Mr. John Aitken read a paper "On some Phenomena Connected with Cloudy Condensation," which contains the results of some very interesting observations made by him. It was shown that the mere presence of an electrified body in the vicinity has no influence on the steam jet. In order to produce the increased density the water particles in the jet must be electrified, either by direct discharge or by an inductive discharge, effected by means of either a point or a flame. The increased density produced by electrification is due to an increase in the number of water particles in the jet, by the electrification preventing the small drops from coming into contact, by the mutual repulsion it produces, in the same manner as the water drops in Lord Rayleigh's experiments with water jets, which scatter more when electrified than when not electrified. The coalescence of the drops in water jets takes place only under the disturbance produced by the presence of an electrified body, while such a disturbance produces no effect on steam jets. Other experiments point to the conclusion that the increase in the den-

sity is due to an increase in the number, and not to an increase of the size, of the drops. For instance, if steam is blown into a receiver full of air in which there are many dusty particles to serve as nuclei of condensation, the clouding is dense; and if there are few nuclei the clouding is not dense. The same statement holds good for the clouding produced by expanding moist air. If many dust particles be present, the clouding is dense; if few, it is not dense. The explanation of the effect of electrification seems to be, that, since the particles in the jet are in rapid motion, there are frequent collisions among them under ordinary circumstances, and a consequent coalescence of the small drops into larger ones; whereas, when the small drops are electrified, they repel one another, and coalescence is in some degree prevented. The jet, upon becoming dense, emits a peculiar sound, which is the same whatever be the cause of the increased density. But when it is electrified, along with this sound there is another, due to the discharge of the electricity, which causes the electrified jet to appear to make a louder noise.

Geographical Variation in Birds.

Lynds Jones of Oberlin, Ohio, writes to *Science* as follows:

In ornithology, geography is the father of trinomial nomenclature. Climate is one great factor in variation, and topography has not a little to do with making the climate; but geography is unquestionably the cause of variable climate, else would the polar regions be tropical instead of frigid. Topography is at best local.

The variations of a species of birds, which make of it several subspecies, are due to its geographical distribution. These varying individuals do not take the name of "forms," as in entomology, but are set apart as true subspecies, each with a more or less well-defined habitat of its own. But there is a serious difficulty in ascribing any sharp line of difference between the forms which intergrade on the outskirts of the geographical range and a corresponding difficulty in ascribing any definite geographical limit. It is not seldom that individuals of one subspecies are found far within the range of another subspecies.

It is a little singular that certain species do not vary—species which are not only found from ocean to ocean in North America, but which are nearly or quite cosmopolitan. Why this should be true of some species and not of others is still an open question. If the scorching sun of the desert regions will bleach out one species, why will it not do the same for another? The plea of adaptation of coloration for protection cannot be urged here.

Not only are colors affected, but size as well, by geographical position. This is probably more marked north and south than east and west; and yet the variation in size alone is not sufficient for a subspecific division. It is not at all strange that those individuals of a migratory species which push farthest north should possess stronger bones and muscles, and so be larger than those which were not able to fly so far. It would seem natural that the constant recurrence of such a difference would tend, in time, to form a race peculiar enough to be recognized as a subspecies. But it has not proven true thus far in the history of the world, and why should there be any change under the same conditions?

THE RAVAGES OF CHOLERA.—The discovery of a method that would protect an individual from cholera would be of great usefulness, for in India, the home of that disease, the average annual mortality therefrom in the cities is 3.32, and in the country 1.32 per 1000 living. The army statistics show that 2.49 per cent of the European soldiers are admitted to the hospital for cholera, while only 0.95 per cent of the native soldiers are admitted for the disease; but the mortality, 33.69 per cent for the former, 35.5 per cent for the latter, is almost equal. In the various epidemic manifestations of cholera in various parts of the world the mortality has often exceeded 50 per cent of those attacked. In 1884 and 1885 cholera was epidemic in Southern Europe, and in Spain in the latter year the official report states that there were almost 120,000 deaths. There were 51 persons affected in each 1000 living, and the mortality was 36 per cent. These statistics stimulated investigators to attempt to solve the problem of affording immunity to cholera.—From *Protective Inoculation for Cholera*, by Dr. S. T. Armstrong, in the *Popular Science Monthly*.

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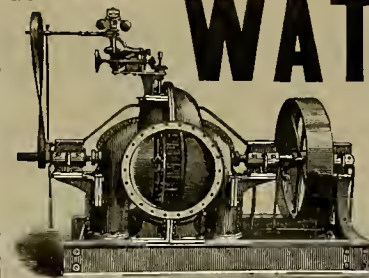
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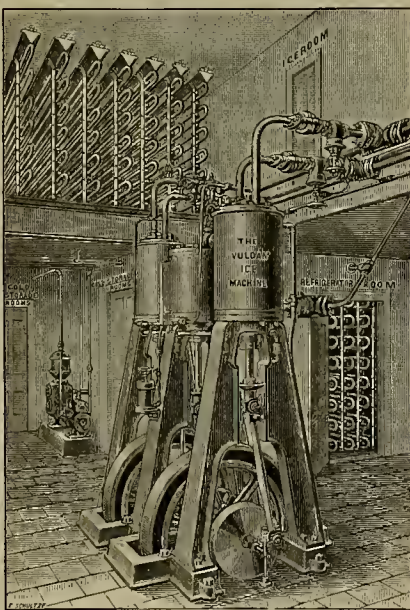
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Electricity.

Power Transmission.

The marked success of the experimental test in Germany of long-distance power transmission by means of high tension alternating currents has added a new stimulus to progress in alternating current motors, and during the past year a number of types have been brought out, some of which aim at the solution of the problem of distribution of alternating currents by producing a motor designed to work with a simple alternating current, and others of which are of a polyphase character, provided with a closed circuit armature, such as were used in the Frankfort plant. It seems, says the *Electrical Review*, that some form of efficient alternating current motor is necessary for the utilization of power when transmitted over long distances. Direct current transmission, as the art now stands, is barred, owing to danger to the insulation and commutators if high tension be used, and is barred by the excessive cost of the conducting-mains, if a low tension be relied upon. In the experiments in Germany an efficiency of 74 per cent between the axle of the turbine and the motor was realized. This, however, did not take into consideration losses in the motor. The latter, however, was very efficient, though probably did not realize as high an efficiency as is possible with synchronous motors. The losses in the transformers were very slight, and the line loss was only six per cent for a distance of 110 miles. These favorable circumstances marked out the alternating current as the agency par excellence for distribution at long distances. One of the types of motor developed during the past year was the Stanley-Kelly motor, which is designed to be operated by a single-phase alternating current, the lag due to self-induction being taken out of the field-magnet by means of condensers, which have the property of giving a lead, and thus the lag created by self-induction in the field-magnet is counteracted. These motors have not yet gone into practical use, but if the promises made by their promoters are realized, they will doubtless meet with a large share of success. Other types of alternating current motors have been developed during the past year by Bradley and others, who were early at work in this field. Mr. Bradley is one of the pioneers in the art of triphase transmission, which was the type of system adopted in Germany. It is probable that the polyphase system of transmission and some form of polyphase motor will be adopted in the plant now in course of construction at Niagara Falls. Whether the system will be based upon inventions developed in this country or upon those which have been exploited abroad, it is impossible at the present writing to say. The gigantic character of the undertaking at Niagara Falls lends great interest to that enterprise. The turbines on the American side will be capable of delivering 125,000 effective horsepower by water passing through a tunnel 6700 feet in length. It is expected that power will be furnished at this plant about the end of March, 1893. The rates announced for power are \$10 per horsepower for 5000 horsepower or over; \$10.50 for 4500 horsepower; \$11 for 4000 horsepower, and so on to \$21 for 300 horsepower, all for 24-hour power if wanted, the cost of ordinary steampower for a ten hour day ranging from \$25 to \$40. It is prophesied that all this power will be used up in local manufacturing establishments. Plans are also afoot to erect a plant on the Canadian side of the Falls and to utilize it in the operation of a number of railways extending for a distance of 25 to 60 miles, the towns and cities in the neighborhood being lighted by the system. The Canadian plant is intended to be operated on the polyphase plan with 25,000 volts.

GENERATING POWER WITHOUT STEAM.

Dr. Nansen's late lecture before the British Geographical Society bristled with ingenious devices for passing away the time during which he expects to be icebound and to drift with the floes toward the much-sought pole. So many of these devices are dependent on the supply of electric current that henceforth no well-equipped arctic expedition will be considered complete without its dynamo. It is easy to imagine how cheering will be the effect of the electric light on those whose perilous task will subject them for some months to almost total darkness. Dr. Nansen's proposed method of generating electricity is at all events original, although somewhat deficient in the quality of reliability. He proposes to have a windmill on deck to drive the dynamo, and when the wind fails to let his men take turn about at a "walkmill," in order to afford them such

salutary exercise as might be involved in heaving imaginary anchors. If this method of generating current should prove effective it is but natural to believe that it will hasten the general adaptation of treadmills in prisons to the generation of electricity.

TOMMASSI'S ACCUMULATOR.—This secondary battery consists of elements made up of tubes of lead, or rigid insulating material, such as celluloid pierced with numerous holes to admit the electrolyte. Each tube has a lead connecting wire down its center, making contact with the active material which occupies the rest of the tube. The inventor, Dr. Donato Tommassi, of Paris, claims that this arrangement gives a much larger capacity per pound of total weight. It also reduces the volume of the cells. The following particulars have been given us by the inventor: Charging current, two and one-quarter to two and three-quarters amperes per pound weight of electrode; discharge current, up to one and three-quarters amperes per pound, down to electromotive force of 1.7 volts. The cells can give as much as three and one-half amperes per pound on emergency; capacity, nine ampere hours per pound of electrode; Coulomb efficiency, 95 per cent; Joule efficiency, 80 per cent. M. Tommassi claims that his accumulator has from three to six times the capacity of the ordinary accumulators, weight for weight. If the accumulators turn out as well in commercial use as in Dr. Tommassi's laboratory—as we trust may be the case—they will be a great advance beyond present practice. A company with £9000 capital has been formed to manufacture these accumulators. We may add that we are not very sanguine about this accumulator, as the principle is some decades old; but Dr. Tommassi may have improved the details enough to obtain the excellent results claimed.—*London Industries.*

STORAGE BATTERY.—For the past several days a car operated by the Woodward storage battery has been doing daily service on the Jefferson street car line, in Detroit, taking and holding its position without a single break in the regular service of that route, and doing a 10-trip (or 70 miles) stint between early morning and 7 o'clock in the evening each day. This has been done side by side with the trolley-cars, taking traffic just as it developed, carrying as high as 85 passengers at a load, and starting and stopping wherever and as often as required by patrons of the road. This exhibit has been made as the beginning of an effort to demonstrate beyond peradventure the commercial value of this storage battery. That the car did each day's work absolutely on time at every point of each trip; that, as compared with trolley-cars, it was almost noiseless and remarkably smooth and comfortable as a vehicle, and that it was in every way superior to the trolley-car are facts apparent on the surface to the most casual observer. It is claimed to be much cheaper than the trolley system, and to discount horses.—*Chicago Journal of Commerce.*

COMPARED WITH GAS.—It is satisfactory to note that even in England, where the electric light has been so unfortunately retarded by legal restrictions, the facilities for procuring current are so rapidly increasing as to make the electric light preferable for almost all purposes, and particularly on the ground of economy to any other method of lighting. Mr. Preece, the electrician and engineer of the postoffice, states that its production is much cheaper than gas. Mr. Preece's report shows that the cost of gas is increasing, while, on the other hand, the price of producing electrical energy is declining. Patents are expiring, experience is growing, manufacturing competition is calculated to contribute to this end, and its growing adoption has an appreciable effect in the reduction of prices. Having dwelt on the obligations of large corporations to assure the supply of pure light as a means of sanitation and eradicating disease, Mr. Preece repudiated the erroneous belief that the electric light was only a luxury for the wealthy, and submitted some useful information in support of his statement that the time was not far distant when the electric light would be available to the poorest citizen.

The wonderful results attained in the employment of electricity for welding have done a great deal to elevate the blacksmith. Many heretofore impossible pieces of welding are now done with the greatest ease. Well has the real inventor of this process fulfilled his part in life, and were he to do nothing else, by giving to the world a process so generally useful, he would have done more than his share.

Useful Information.

VULCANIZED INDIA RUBBER.—An investigation has recently been conducted by Lieut. L. Vladimiroff at the St. Petersburg Technical Institute, says a foreign exchange, with a view to establishing rules or tests whereby the quality of vulcanized india rubber may be efficiently judged. It is a notorious fact that no method of chemical analysis gives reliable results for this substance; hence the tests applied were chiefly of a physical nature. From a lengthy series of experiments the following conclusions were deducted, namely: 1. India rubber should not give the least sign of superficial cracking when bent to an angle of 180 degrees after five hours of exposure in a closed air bath to a temperature of 125 degrees Centigrade. The test pieces should be six centimeters thick. 2. Rubber that does not contain more than half its weight of metallic oxides should stretch to five times its length without breaking. 3. Caoutchouc, free from all foreign matter except the sulphur used in vulcanizing it, should stretch at least seven times its length before rupture. 4. The extension measured immediately after rupture has taken place, should not exceed 12 per cent of the original length of the test-piece of rubber. The test-piece should be from 3 to 12 mm. long, 3 cm. wide, and not more than 6 mm. thick. 5. Softness may be determined by measuring the percentage of ash formed on incineration; it may form the basis for deciding between different grades of rubber for certain purposes. 6. The vulcanized rubber should not harden under the influence of cold temperature. These conclusions are to serve in the establishment of rules governing the introduction of vulcanized rubber into the Russian navy.

STREET CAR GAS MOTOR.—It has been decided to use the Connelly Street Car Gas Motor on three of the cross-town lines of the Chicago systems. The first of these motors, says the *News Record*, stands almost ready for the rails in the company's shop in Clinton street. It is a simple piece of mechanism, comprising a vertical gas engine furnished with a heavy fly wheel on one side and a friction disk on the other, all mounted on an enclosed 4-wheel car truck. The motor will develop 10 h. p., and will be run with Pintsch or natural gas, preferably the latter, the gas stored in tanks either at the sides or under the roof of the car. Unlike most gas motors, the piston receives an impulse at every revolution, using 7 parts of air to one part of gas for the explosive agent. Toothed gears are dispensed with altogether, power being transmitted to the car axle by a link belt. A shifting lever throws the driven friction wheel across the entire face of the driver, so that in starting great power with low speed is secured to be gradually changed to high speed and of course less power as headway is made. The motor will be noiseless, able to pull 3 loaded trailers and can climb a 6 per cent. with ease. It is considered a strong probability that this gas motor will be substituted for horses on all horse car lines of the north and west sides.

VENTILATING A TUNNEL.—The Pennsylvania Railroad Company is now ventilating its tunnel through Baltimore by fans driven by electric motors, the current being transmitted from a powerhouse situated near the North avenue end of the Bolton yard. A ventilating stack and fan have been erected over the northern section. The current for the operation of the fans is conducted through the tunnel to the ventilating shafts. Arrangement is also made to light the tunnel by electricity. The ventilation is accomplished by means of a slanting subway eight feet wide by sixteen feet high from the side of the tunnel, near its top, to the foot of the ventilating stack, which, on account of the heavy foundation necessary, is located at the side of the tunnel. At the foot of the shaft a large fan, fashioned like the blades of a steamboat propeller, revolves on a vertical shaft, forcing a strong upward draft. The vacuum created at the middle of the tunnel causes the smoke and gas to be drawn from the end of the tunnel to the center, and out the top of the stack. The stacks are 100 feet high and 18 feet square. Adjoining each stack there is a small ornamental brick house for the storage of oil and materials used in operating the system. By this system the tunnel is cleared of smoke and gas in less than two minutes after the passage of a train.

The gross earnings of the railroads of the country last year are estimated by the statistician of the Interstate Commerce Commission at \$1,222,711,693, an increase of \$125,950,303 over the earn-

ings of 1891. The operating expenses were \$814,722,082, an increase of \$82,834,109, which leaves an increase in net earnings of \$43,116,114.

COAL was hardly used at all 350 years ago, remarks Mr. J. E. Taylor, F. L. S. Yet since then Great Britain has consumed nearly half the stock deposited by nature in its coal cellars many millions of years ago. At the present rate of increase in consumption what will be the condition of those cellars after another 350 years? It is clearly indicated that this period will witness a marvelous development of the economic science. Coal, long before that, as a form of energy will be regarded as a somewhat antique and worked-out material. The ebbing and flowing tides, the shifting winds, the waters running to the ocean, perhaps even volcanic and earthquake energy, will have taken its place. Indeed, a line of inquiry and research now going on may possibly affect the commercial interests of the whole world within the short space of the next five years. This relates to the use of petroleum, already being tried on steamers and locomotives of the Caspian sea and vicinity. The coal fields of the world will certainly be worked out within an historically brief period, but a distinguished Russian chemist finds grounds for believing that petroleum is still being formed by the action of water on heated metallic deposits, and that the supply will be permanent.

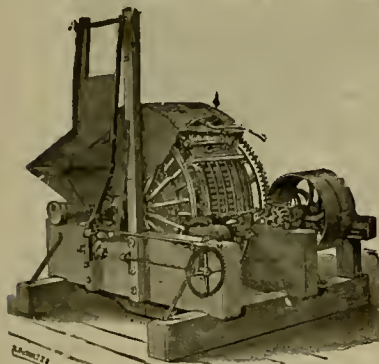
THE ALUMINUM DECISION.—A decision rendered by the United States Circuit court, northern district of Ohio, eastern division, on Wednesday, is of no little importance to the aluminum trade. By this decision the litigation between the Pittsburgh Reduction Company and the Cowles Electric Smelting and Aluminum Company, of Lockport, N. Y., closes in a victory for the former. Two years ago the Pittsburgh concern entered suit against the Cowles Company for infringement on a base patent on the process of dissolving alumina in fluorides and passing a current of electricity through the mass, thus producing aluminum. This is the only aluminum process which has proved a commercial success. Judge Taft decided in favor of the complainant on every point, thus giving the Pittsburgh Company the exclusive right to the only aluminum process which has been successful commercially. The case was stubbornly fought on both sides, and the Pittsburgh Reduction Company deserves credit for the vigorous manner in which it has defended its claims.—*American Manufacturer.*

THE CORROSION OF ALUMINUM.—Among the many fictions which have been disseminated concerning aluminum, says the *London Electrical Review*, is that of its incorrodibility by sulphuric and nitric acids, whether dilute or concentrated; this statement has, strange to say, been subscribed to by such eminent authorities as Deville, Wustz, Hunt, Langly and Roscoe, whom, it must be presumed, did not use the pure metal in their experiments. Mons. G. A. LeRoy, having been induced to study the possibility of replacing lead and platinum by aluminum in various manufactures, has been surprised to find that the statement of these authorities is entirely incorrect on this point. Experiments made with four different samples of aluminum, the composition of which is stated, two of them being made by Deville's process at the old Nautern Works by Messrs. P. Tronin & Co., show that the pure metal is so rapidly attacked by strong nitric and sulphuric acids, even in the cold, as to be quite unfit for use in the manufactures or processes in which these acids take any part.

CHROMIUM BY ELECTROLYSIS.—In a recent issue of the *Comptes Rendus*, of the Paris Academy of Sciences, M. Em. Placet describes a new method of preparing chromium by electrolysis. An aqueous solution of chrome alum is first made, to which is added an alkaline sulphate and a little sulphuric acid, and a current is then passed through the solution. Pure chromium is then deposited at the negative pole. Thus prepared, the metal is of a bluish-white color and very hard. It resists atmospheric influences, and is not attacked by concentrated sulphuric acid, by nitric acid, or by a concentrated solution of caustic potash. It is proposed to carry chrome-plating on an industrial scale to replace the nickel plating. Good adherent deposits of chromium have been obtained from the same bath on brass, gun-metal, copper, and even on iron. The deposit is said to resemble oxidized silver. An ingot of the pure metal, weighing one pound, has been prepared and sent to the Academy by the inventor of the process, who is now engaged in investigating various alloys of the metal.

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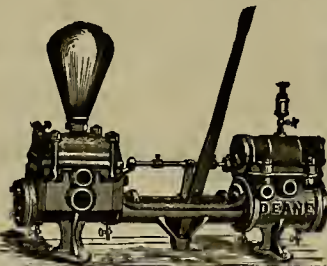
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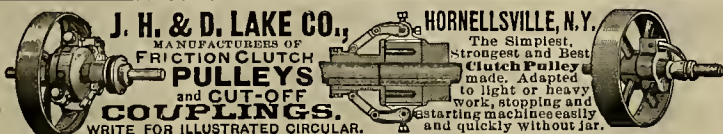
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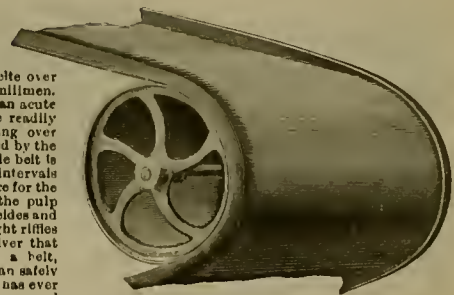
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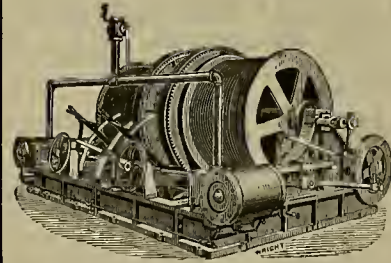
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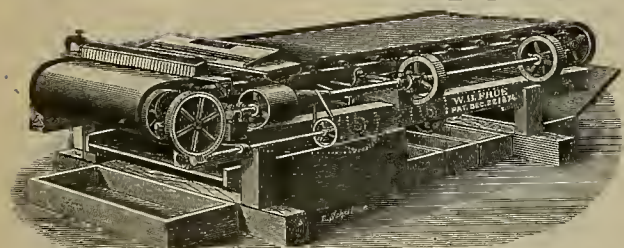
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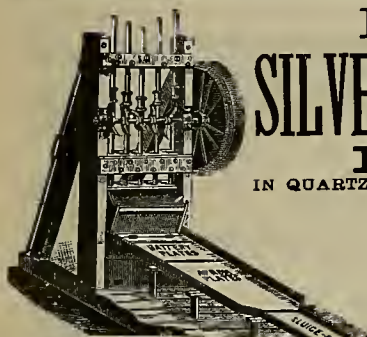
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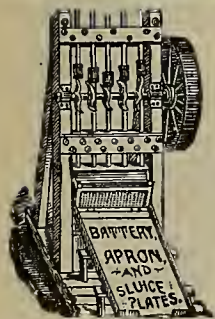
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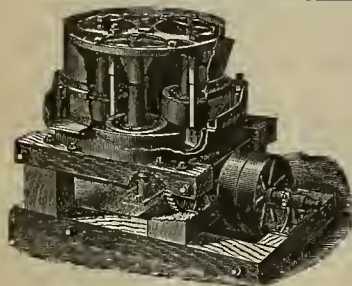
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

HECTOR.—Amador Record, Jan. 19: Foreman G. T. Taylor informs a Record reporter that the Hector mine is now cleared of water to the 900 level. It has been a long and tedious job to hoist the immense body of water from the old workings, as the Lincoln mine to the north virtually drains its surplus into the Hector shaft. Mr. Taylor undoubtedly feels that he is entitled to some credit, as his own company had some doubts of his being able to clear the mine at this season of the year with the imperfect appliances—double skips—now in use for hoisting water. It is contemplated very soon to replace the skips by an improved pumping plant. The company, as well as the chief manager, Mr. Valentine, are entitled to great credit for the perseverance they have so far shown in opening up this magnificent property. It is proposed, now that the 900 level is clear of water, to thoroughly explore it, and in the meantime to probably go another 100 feet, so as to be ready for all contingencies. Within the next week or two the 40 stamps of the mill will be pounding away on surface rock taken from the upper levels. This will be continued until the 900 level is explored and can turn out sufficient rock to feed the mill. The Hector mine is on the mother lode and adjoins the Wildman on the north, and the Lincoln lies still north of the Hector; and, by the way, that Lincoln mine is an eye-sore to the people of this section, just because a Scotch and American company own the stock and are locking horns over some imaginary trouble about the management of the mine. Our local mining sharps cannot understand just why this splendid property is lying idle. There is another mine on the mother lode, north and east of the Lincoln, that the Record wants to say something about, viz., the Belmont. Superintendent Tibbitts has done as much work for the money as has ever been done in this section, and the whole of it has been virtually thrown away through the parsimony of the directors of the company he represents. Let it be understood that Mr. Tibbitts and no other managers for eastern companies ever say anything about their properties. The fact is, they are afraid to. What the Record gives is common local talk by mining men in the immediate locality. The fact is, all eastern companies appoint a superintendent for their properties, and then hemper him in every way, and expect him under these conditions to do impossible things. But never mind; the Belmont has a great future before it, and with proper appliances, proper machinery, and with some liberty of action to its superintendent, Mr. Tibbitts, it will prove itself to be one of the great mines of the mother lode. The mine needs pumps instead of skips for raising water, for all the humbugs that were ever tried for hoisting purposes and waste of money, the "skip" can take the "cake." It is generally understood that the Belmont Co. will this spring put in a new plant on their property. It certainly needs it, if successful and economical work is to be done.

MINING EXCITEMENT IN IONE.—Amador Dispatch, Jan. 21: Quite a ripple of excitement was created among the people of Ione a few days ago by the discovery of a very rich quartz ledge a short distance above the new Preston school-building, on Mrs. Mullen's ranch. Some of the rock which was tested is reported to be almost fabulous in richness. In consequence of this unexpected discovery, a large number of the citizens visited the place last Sunday, notwithstanding the heavy rainstorm that was prevailing at the time. It is not yet known how extensive the ledge is, as it was only the top rock that was prospected.

BAY STATE.—Amador Record, Jan. 19: The new pump put in at the Bay State mine by Knight & Co. is taking the water out of the shaft at a lively rate, and Superintendent Jones is well pleased with it. Dr. Boyson, of San Francisco, is now in Plymouth, looking after his mining interests. He has the Bawden claim bonded and has sunk a shaft 45 feet, and is now crosscutting for the vein. He will remain in Plymouth until the ledge is encountered. The doctor has extensive mining interests in Amador and is not backward in asserting that this is the banner quartz-mining county in the State. At the South Enreka mine they are preparing to sink. The water being so strong, it would be impossible to sink without controlling it in some way, and in order to save the purchase of a pump, the superintendent, J. F. Parks, has constructed a bulkhead in the east crosscut, thus holding the water at the 500-foot level until such time as is seen fit to tap the same and draw the water off. A bulkhead has never yet been tried by any of the mines in this section, but we are informed has been successfully employed in other mining districts. If successful in the South Enreka, and we can see no reason why it should not be, it will no doubt be used by other mines to successfully handle their water when sinking. Foreman Riley is now having the sump cleaned out, and sinking will be commenced at once and continued for 300 feet, and from present indications at the 500 level, this mine will soon be placed on our bullion-producing list. At the Wildman mine they are progressing very rapidly in sinking to a lower level and are now within one or two sets of timbers from the 1000 level, the 100 feet having been sunk in less than four weeks. Superintendent John Tregloan feels very proud over the result. Mining men say that it is the most rapid sinking ever done in this district on the mother lode. Mr. Tregloan attributes a good

deal of this success to the splendid body of men he has in his employ and to the facilities in having good pumps with which to handle the water. The superintendent intends to continue sinking another 100 feet, unless stopped by the directors of his company. The advantages in having two or more levels to work on are manifold in even inexperienced miners. In the opinion of the Record, and some of our very best informed mining men, Mr. Tregloan's company will show the part of wisdom if they permit him to work the mine in his own way. The expenses would be lowered, in proportion to the output, and the general prosperity of the mine largely increased.

Butte.

AT THE PHOENIX.—Oroville Mercury, Jan. 23: Dr. T. W. Serviss, Dr. F. W. Gibson, L. E. Norton and a Mercury reporter were a party of four that left Oroville yesterday morning to visit the Phoenix quartz mine, near Hurlston. The party was also accompanied by Dr. Bebee of Kansas. The Phoenix is situated about 24 miles from Hurlston, to the southeast, and is a lode that has for years been famous for its richness in free gold, many thousand dollars having been extracted from it by primitive means. It is only since its acquisition by the present company that any efforts have been made to work it upon a large scale. It is now under the immediate superintendency of George S. Colmen, a miner of long experience in Colorado and Central America. He has now a crew of men sinking upon the lode, and a depth of 105 feet has now been reached. From this point levels will be run north and south and sinking continued. The ledge is from 6 to 12 feet wide, and carries a heavy percentage of high-grade sulphurets. The rock also runs very high in free gold, and repeated panning by the party yesterday from the dump showed, without exception, almost marvelous prospects. New buildings for the miners, a shaft-house and new mill, are in course of erection, and within 30 days Mr. Colmen expects that the Phoenix will be adding to the gold output of the county. The sulphurets will be all concentrated, and for the present shipped to reduction works for treatment. The mine is situated upon a bold ridge of the Sierras, at an elevation of 1776 feet, and from the buildings a magnificent view of the Coast Range, Lassen Buttes, Marysville Buttes and the whole Sacramento valley is obtained.

Calaveras.

WEST POINT DISTRICT.—Cor. Calaveras Chronicle, Jan. 21: At the Cleveland mine, situated on the south bank of the Mokelumne river, and owned by Mitchell & Co., they are taking out ore that will go \$30 per ton. The Williams mine, Trappiener & Co., owners, are also taking out good rock. At the Comet mine, owned by Larson & Co., they are at present taking out ore that will go \$100 per ton, while Paddock & Co. are also extracting some good-looking ore from their mine. Nixon & Co. are busily at work on their property. The rock from this mine, at the last run of the mill, paid over \$100 per ton. Gibson & Co. are taking out some fine ore from their mine at Sandy gulch, as are also Bardsley & Herbert. Chick & Loyd are at work on their mine, and the prospects are flattering. Mr. B. Carlton has quite a number of tons of ore on the dump ready to crush. The Blazing Star mine is still keeping the water out and will commence work again when everything is arranged satisfactorily. The Riverside Co. are also arranging their affairs, and will resume operations shortly. The Scorpion has resumed operations under the management of Mr. M. Dennison, and we look forward to good returns from this property. The Keltz mine, owned by Peasley & Co., recently crushed ten tons of ore that yielded \$60 per ton. Jenkins & Co. are working along on the Barnes, Billy Williams and Henry mines. The Morning Star mine, the north extension of the Henry mine, has been swallowed up by a homestead patent, and that is the way a great many of the localities are going—like an auction—going, going, gone! The North Star mine is still in the land of the living, and will "get there" before long, while the Lockwood is still quietly resting on its reputation. The Lone Star and Reed & Hillery mines are parallel veins running nearly north and south, from 100 to 150 feet apart. They are situated on the North fork of the Mokelumne river, about four miles westerly from the village of West Point. The lodes are worked by tunnels, one of which is on the lode all the way for a distance of 1300 feet, and is called the prospect tunnel, and you can rest assured that it is a fine piece of work. I took some samples of the ore from the end, or the face, and they were rich. At a distance of 1300 feet under the mountain we would be at a perpendicular depth of about 400 feet. The two mines are connected at intervals by cross-tunnels, which give a good ventilation. There are nine or ten tunnels run in from the mountain-side on these lodes, and they are all connected, the one with the other, by winzes or chutes sunk on the lodes at intervals for the double purpose of giving good ore and also to facilitate the extraction of the ore. The veins or lodes in some places were 10 and 12 feet wide, but I think they will average all the way through on both lodes about five feet. There are about 1000 tons of ore at present in the different chutes ready for the mill, which is 20 stamps and is kept running day and night. The sulphurets are concentrated on blankets and worked by a pan. The drills are run by compressed air, which is supplied by three compressors; the forges and blacksmith shops are all supplied with compressed air, and the compressors are run by waterpower from a height of 300 feet above. The Lone Star Company own the West Point ditch, and therefore have all the power they wish, either to run the drills by air or electricity. The mill is also run by waterpower, and it is situated so that whichever way or tunnel the rock may come from the mine, it finds its way on a properly constructed track

to the mill. Even at the lower tunnel, which is 25 feet from the river-bed, the rock is brought out and hoisted up to the crusher in the mill by the same waterpower that runs the mill. The mill, I should judge, will crush about 30 tons per day. The output of the mine, of course, is a great deal more, but it is kept in chutes in the mine, which when full will allow of further prospecting. I think that the mine is good for many years yet as a producing mine, and, judging from the looks of the ore, a paying one also. Of course some of the rock runs over \$100 per ton, but the general average would be about \$18 per ton, which is plenty high enough to make it a paying investment.

El Dorado.

SLATE.—El Dorado Democrat, Jan. 21: A number of improvements have been recently made at the California slate quarry since it has changed hands. A channeling machine has been put in for cutting out slate in blocks, saving a great waste of material which necessarily resulted from the blasting process. An air compressor is being negotiated for to drive the machinery, new buildings are going up, and an air of business prosperity hovers over the premises.

Nevada.

BRUNSWICK MINE.—Grass Valley Telegraph, Jan. 23: Supt. W. A. Hawley informs us that everything is working to a nicety out at the Brunswick mine. The shaft is being put down deeper, and the water is easily handled. The ground is tolerably good considering what they have gone through. A station is now being cut at the 700 level, and drifts will be run east and west as soon as the station is completed.

BEN FRANKLIN MINE.—The Ben Franklin mine is located at the western foot of Osborn Hill, and is owned by Michael White and sons. There is a tunnel in the hill about 150 feet in length, and there is a ledge nearly all the way that averages about 10 inches in thickness. A crushing from the Ben Franklin has just been completed, and the result was \$33 per load. There were 12 loads crushed.

THE PROVIDENCE MINE.—Nevada Transcript, Jan. 23: The old Providence mine is now assuming its pristine glory. The mine is looking splendid, and from present appearances bids fair to outrival all former outputs of the precious metal. The ledge now being worked is very large, and is paying handsomely. There are about 50 men employed in the mine, and a few more have been engaged to go on next week. Twenty of the forty stamps are being run night and day, and in three or four days ten more will be started up, and it will not be long before the other ten will be pounding away for an indefinite time. The new owners are very proud of their mine, and are confident that they have one of the very best in this district. The mine has been opened up under the superintendence of Carl Davis, who is regarded as one of the best quartz miners in the State.

HUNSON BAY MINE.—Transcript, Jan. 21: Work has been going on quietly but steadily and firmly at the Hudson Bay mine for some time past, and now the shaft is down 142 feet. The rock has heretofore been very hard, but in the past day or two it has been getting better, and yesterday a beautiful quartz stringer was found in the bottom of the shaft. Mr. Alf. Tregidgo brought some of the rock, taken from the stringer, to town, and it is of the very best quality. The stringer is a large one, and from the indications we would not be surprised to hear of the ledge being tapped at any hour. The water is being easily handled, and work is being pushed ahead to the greatest advantage. The Hudson Bay joins the North Star on the north, and the whole surrounding country is famous for its rich ore veins.

San Diego.

THE LOST PEGLEG.—San Francisco Chronicle, Jan. 22: Another party of prospectors has left this city in search of the famous lost Pegleg gold mine, which exists somewhere in the Colorado desert between Yuma and Los Angeles. The party is composed of Thos. L. Doran, John D. Bell and Jas. Corcoran. The last two are old mining prospectors and experts. The former, Thos. L. Doran, is now on his third trip in search of the fabulously rich lost mine. Doran's adventures have been published before, and the history of the mine and the many searches made for it have filled es many columns in different newspapers as there are skeletons of the searchers bleaching on the desert. In both of Doran's former trips he nearly lost his life from the hardships he went through, and the last time he was saved by Bell, who was his companion. The members of the party feel that they will be successful this time, as they have secured, after six months' search this summer and fall, a tracing of the exact route followed by Pegleg Smith when he crossed the desert and found the "three little golden hills." The plan of the party is to go to Los Angeles, where they will stay two days, and then proceed to San Bernardino, where they will get their outfit. They will then strike for the desert, through Warner's Pass, where Pegleg Smith ended his wearisome journey. From Warner's Pass they will follow the line traced on the map as closely as they can, but will not proceed more than two days forward before hunting for the "three little golden hills higher than the rest," which they expect will bring them millions of dollars. This will cause the party to explore a more northern part of the desert than Doran has been on before. The party is prepared to make a systematic search for six months before the excessive heat compels them to leave the desert.

Siskiyou.

BLUE GRAVEL.—Yreka Journal, Jan. 23: Lee, Lash & Co., of the Greenhorn blue gravel mine, just south of Yreka city limits, are now tunneling to get on the main channel, as a large boulder was found at the bottom of the new shaft, which must be removed. A good prospect was found at the bottom of the shaft, and good pay is anticipated above the immense

boulder. The new steam pump lately received works fine and keeps the sillage water drained from the claim with the greatest ease. Spencer & Co., of the Siskiyou quartz mine, on the north branch of Cottonwood creek, took out about \$1000 from one week's crushing with a two-stamp mill lately, and are now sinking down on the ledge for the purpose of opening it to better advantage. The ledge averages 24 to 3 feet in width, and appears to be a permanent lode, with quartz enough in sight to yield a large amount of gold, as it is very rich. Water has been turned into the ditches at Quartz Valley and Oro Fino, where hydraulic mining is carried on with good success, to be continued right along until late in the summer, as there is considerable snow on the Salmon range of mountains to afford a good fountain. The cold weather lately interferes with mining to some extent, by freezing up the water supply, so that work cannot be commenced early in the morning, besides hardening the ground for tough digging until after the sun is up awhile.

Shasta.

THE REID MINES CONSOLIDATED.—Redding Free Press, Jan. 21: The Reid Mines Consolidated Company of Old Diggings district own three claims, or 4500 feet of ground, located north and south, and on which there are at least five parallel ledges running in the same direction. To open up and develop these ore bodies is the aim of Col. Stevenson, the president of the company. To do this in a workmanlike manner, Col. Stevenson has commenced at the lowest point by sinking the old Spanish incline shaft to a greater depth. What is known as the Spanish shaft was commenced years ago, and was sunk about 60 feet on very rich free-gold ore, when the ledge appeared to pinch out. The new company, having purchased the property from E. A. Reid and others, miners were set at work in the shaft, and on going a distance of 15 feet, the ledge came in good and strong, the ore assaying quite rich. At present there are three shifts at work, and the shaft is down 110 feet, with a strong ledge of ribbon quartz four feet thick, the ore well mineralized with some free gold, but mostly steel sulphurets. A clay gouge continues with the vein which pitches east, and is considered a good indication. The walls are well defined and composed of metamorphized porphyry, the hanging-wall being partially crystallized. The ore on the dump will average about \$40 to the ton. About 500 feet up the mountain Mr. Stevenson will sink another shaft as soon as the road to the spot selected is completed, which is now well under way. The Spanish shaft will be extended down 500 feet; then from it a level will be run east 300 feet, crosscutting all the ledges at great depth, and from which level a tunnel will be extended on the large ledge and connected at greater depth with the proposed new shaft farther up the mountain, spoken of above. In this way the mine will be opened up in good shape and all the ledges exposed, and to obtain an abundance of ore it will only be necessary to run a series of slopes to the surface. Col. Stevenson thinks, judging from the formation, that at a depth of 500 feet free gold will be encountered in the quartz. Passing over the ridge, we came to the five-stamp mill owned by the company, which was running on rock taken from a tunnel on the east side of the mountain, and which we did not visit. There is only a small batch of ore from this tunnel, and as soon as it is worked ore from the Spanish shaft will be hauled to the mill and tested.

SILVER SHIPMENT.—The Lost Confidence mine, at Iron Mountain, shipped by Wells, Fargo & Co., on Thursday, 20 bers of silver bullion, the shipping value being \$20,000. The bars showed a total of 31,657 ounces. This is the result of their last run, the mine having shut down pending an advance in the price of silver. During the past six months 9000 tons of ore have been handled, giving employment to many men. It seems too bad that the low price of silver has stopped an industry of so much value to this country.

MINING ITEMS.—Wm. G. Hodson, secretary of the Miners' Association, shipped nine boxes and six sacks of ore to San Francisco this week, to be placed on exhibition at the Mechanics' Fair. The Millville Tidings says that Orrin Welsh and Sam Lofton have struck an old river channel on a branch of Cow creek, which promises to be very rich. Frank Panter owns an extension to the Reid Mines Consolidated Company, and is running a tunnel to crosscut the same ledges extending north and south on the company's ground. Being lower down on the hill, he will have good ore-backs. We learn that E. L. Bellou, of Igo, who has recently purchased new machinery, is going to make a success of his plant. Mr. Fitch, who was recently over in that country, says there is much turmoil over the ownership of certain claims, and that claim-jumping is a daily occurrence.

Sonoma.

CHROME.—Sebastopol Times, Jan. 20: The Healdsburg Chrome-Iron Company has received from the Nevada Metallurgical Works of San Francisco the following assay of ore, sent to that establishment: "The piece of ore contains 41.3 oxide of chromium; chrome, 20 per cent." Mr. Hagaman informs us that this is satisfactory to the company, and that work of developing will be commenced at once.

Trinity.

TRINITY RIVER MINES.—Cor. Journal, Jan. 21: The writer left Weaverville in company with Mr. J. R. Flegg on Monday of last week, to whose courtesy he is indebted for a ride to Douglas City, and then down to Hurst & Eliason's claim at Steiner's Flat, which were told has been worked by them since 1874. There are in this property 100 acres patented. Two ditches one-half and one mile long respectively, bringing the water to the mine from Dutton's creek with a pressure of 250 feet; 300 feet of 15

and 11-inch pipe carries the water to the giant which discharges it on the banks, which average 40 feet in height. We are informed that it pays about 10 cents per square foot, and that in an average season they strip about 20,000 feet of bedrock. The early rains enabled them to commence piping at least a month earlier than usual this season. They also own 80 acres of school land, as well as 60 acres more of mineral land. On that portion of their property devoted to agriculture they raise several varieties of apples, pears, peaches, strawberries, raspberries, blackberries, gooseberries, currants, etc., besides an endless variety of vegetables and melons. The day after our arrival there, I was ferried across the river to the Hubbard claim by one of the employees on the ditch and climbed up the hill to the camp. The prevailing opinion seemed to be that it would take about a month longer to put the ditch in condition to enable them to begin piping operations. Passing on down the river about four miles by trail, I reached the Evans' Bar claims of H. H. Carr & Sons, who own 65 acres of good mining ground, two ditches of one-half and three-quarters of a mile each from Skunk creek conveying the water to the two 800-foot strings of 15-inch pipe, at the end of which two giants with nozzles of 5, 6 and 7-inch diameter and 180 feet of pressure discharge the water on the banks of gravel. The sluices are about 300 feet long, paved with blocks 12 inches square. The gold in this property is generally coarse, and the best cleanup made in any season during the five years of the present ownership amounted to a little over \$7000. The upper bench of gravel is very rich, but the owners are working off the lower bench so that the gravel can be used for a dump in the future. The day I was there the bones of an Indian were piped out with a stone pestle, a large seashell and about a hat full of obsidian strips. One of H. H. Carr's sons ferried the writer across the river, where, after climbing up the hill for two or three hundred feet, he struck an old ditch, along which he traveled about half a mile to the Last Chance mine, belonging to Ham & Marsh, who own 31 acres of very rich ground. Last week two pieces of \$8 and \$15 respectively were picked up in the top dirt, which is said to be very rich, one piece of \$47 having been found there last spring. Messrs. Ham & Marsh do not own any water-rights, but have to depend upon the seepage water, and consequently can wash off but very little of the rich ground they own.

NEVADA.

Washoe District.

CON. CALIFORNIA AND VIRGINIA.—Virginia Chronicle, Jan. 21: 1100 level—Have removed the air-pipe and track-rail from this level and suspended prospecting there for the present. 1500 level—We continue running water through the old stopes at different points. Have resumed the extraction of ore and fillings from the south drift where it connects with the old stopes. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connection with the 1500 level, north drift. 1650 level—Have continued making necessary repairs to the drifts on the sill floors of this level. We continue to extract some ore from the old stopes, eight floors up in the upraise, No. 6 carried up from the main north-west drift; also from the old stopes in working north from the crosscut run west from the north-west drift. Have extracted during the week from the 1500 level stopes and 1650 north-west drift openings and raised to the surface 260 tons of ore; average car assay value, \$32.70 per ton.

OPHIR.—1465 level—The upraise started on the sill floor, on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground, 101 feet below the sill floor of this level, has been carried up 12 feet; total height, 86 feet, continuing in porphyry with quartz.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 15 feet; total length, 478 feet; continuing in porphyry and clay formation.

UNION CON.—900 level—The joint Union Con. and Sierra Nevada west drift has been extended during the week 24 feet; total length west of joint shaft, 2845 feet. The face is in porphyry and streaks of clay.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 26 feet; total length, 594 feet; face in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 24 feet; total distance west of shaft 2845 feet; face in porphyry and clay.

ANNES.—On 420 level north drift from east crosscut No. 1, north, was advanced 18 feet; total, 49 feet; formation, quartz of low assay value.

BEST & BELCHER.—200 level—During the week the north-west drift has been advanced 14 feet, passing through clay and porphyry; total length, 149 feet. 900 level—West crosscut No. 3 has been extended 18 feet through porphyry and seams of clay; total length, 87 feet.

GOULN & CURRY.—200 level: During the past week, west crosscut No. 5, started 432 feet from main west drift, has been advanced 16 feet; total length, 258 feet; face in hard porphyry and stringers of quartz. On the Suto tunnel level the joint north drift with the Savage Co. has been advanced 24 feet; total length, 840 feet; face of drift in hard porphyry.

CHOLLAR.—The north drift from the south line, 550 level, is out 115 feet; face in quartz giving low assays. Are repairing north drift, 750 level, and retimbering the two north compartments of the main shaft. The north drift from the east crosscut, 160 feet south of north line, 930 level, is out 103 feet; face in porphyry and clay. Have discontinued this drift and

from its face started an east crosscut, which is now in 9 feet; face is in porphyry.

HALE & NOBECROSS.—We continue retimbering main shaft above the 600 level. Main Incline—Are making the necessary repairs, and have completed the work of retimbering that portion of the incline between the 1700 and 1800 levels, which required retimbering. 1800 level: West crosscut No. 1 from the main south drift was advanced 20 feet; total length, 55 feet; face in porphyry and quartz. No. 3 west crosscut from main north drift was advanced 17 feet; total length, 252 feet; face in porphyry with streaks of quartz. West crosscut No. 4 from main north drift was advanced 18 feet; total length, 112 feet; face in porphyry with streaks of quartz.

POTOSI.—The south drift from top of raise, 1000 level, is out 45 feet, following a streak of quartz from three to six feet wide, which has narrowed down to 18 inches in the face of the drift, and contains bunches of good ore. Are grading and enlarging the connection between the Potosi winze and the north-west drift, 1800 level Ward shaft. Extracted and sent to the mill the past week 442 tons and 1500 pounds of ore from the 550, 930, 1100 and 1150 levels. Milled during the week 444 tons; on hand at mill, 80 tons, 150 pounds. Average battery assays, \$25. Average car sample assays, \$33.29. Shipped to U. S. Mint, Carson, 299 pounds of crude bullion.

WARD SHAFT.—There has been no work done on the 1800 level of the Alpha and Exchequer during the week. Have been engaged in placing pressure pipe in the shaft. The west crosscut from the north-west drift 300 feet south of north line of Bullion, 1800 level, is out 200 feet; face in low grade quartz and porphyry. Are still enlarging the connection between the Potosi winze and north-west drift, 1800 level.

OCCIDENTAL.—The main north drift, 750 level, has been extended 17 feet; total distance from No. 1 winze 607 feet; face still in low-grade ore. No. 2 winze from south drift, 750 level, is down 11 feet in low-grade ore. East crosscut No. 2 in Zadiq drift, Suto tunnel level, has been advanced 14 feet; total length, 157 feet, and has reached the east wall. No ore of value was found in the crosscut. Have resumed driving the main south drift.

BULLION.—Have started a crosscut east from north drift from top of raise from east crosscut 320 feet of north line, 1300 level. The face is in porphyry and low-grade quartz. The west crosscut from the north-west drift, 300 feet south of north line, 1800 level of Ward shaft, is out 200 feet; face in low-grade quartz and porphyry.

EXCHEQUER.—There has been no work done on the 1800 level during the week. Have been engaged in putting water column in the Ward shaft.

ALPHA.—There has been no work done on the 1800 level during the week. Have been engaged in putting water column in the Ward shaft.

KENTUCK.—During the week we have extracted 12 tons of ore from the 6th and 7th floors above the east crosscut on the 160 level. Car samples average \$39.40 per ton.

NEW YORK.—The west crosscut from the southwest drift from the shaft, 850 level, is out 7 feet; the face is in a mixture of clay and porphyry. Are extracting from 10 to 12 cars of ore per day from the 700 stopes, car samples averaging about \$30 to \$40 per ton. Shipped to the Washoe mill during the past week 167 tons, 922 pounds of ore; milled during the week 167 tons, 922 pounds of ore; on hand at mill, 60 tons; average battery assays, \$34.72; average car sample assays, \$36.70. Shipped to U. S. Mint, Carson, 262 pounds of crude bullion.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 6 feet; total length, 33 feet; the face is in hard porphyry.

Robinson District.

A BLOOMING CAMP.—White Pine News, Jan. 21: Frank Burk, who was in Ely a month ago, has been writing up this section in the Salt Lake Tribune, and to say that he looks at it through rose-colored spectacles is drawing it mild. He says so many good things about Robinson district that it is a difficult matter to make a selection, and we would fain publish the letter entire, but its great length stands in the way. Speaking of the Monarch, owned by R. A. Riepe, he says: "This, according to old miners, is a better-looking proposition than Butte was when the now famous Anaconda was first started." Further, he says: "To understand the great untold resources of this country, a person should visit it and see for himself. I simply give a meager outline of what was seen in a five days' sojourn, where other business seriously interfered with the work of looking up prospects. One thing is certain, that if the long-talked-of railroad comes through the valley here, Ely will far surpass the most sanguine expectations of her warmest admirers."

White Cloud District.

COPPER.—Lovelock News Era, Jan. 20: Ernest V. Clemens, a cousin of Mark Twain, and treasurer of the White Cloud Copper Mining Company, in honor of whom the new town of Clemens has been named, arrived from New York city on Saturday last. He immediately took stage for White Cloud district to inspect the property. This is Mr. Clemens' third or fourth visit. He believes the range of mountains in which the copper mines are situated to be as heavily mineralized as any in the known world. He will return to Lovelock by Saturday and continue on to San Francisco to hasten the shipment of the bucket tramway from the California Wire Works. A two-months' test run of the 40-ton square furnace, which has been erected at Clemens, will be made when the tramway is in position to deliver ore from the mines.

BRITISH COLUMBIA.

OSOYOOS.—Colonist, Jan. 15: The district of Osoyoos has come to the front in a very remarkable way during the past year as a gold-producer. The principal camp is about Fairview, in the vicinity of Rock creek, and embraces the well-known claims of Ratler, Brown Bear, Silver Star and Wymn, acquired by Geo. Atwood and E. D. Reynolds for the Ratler English Milling and Mining Co. These properties were paid for in spot cash, and the direct amount of money transferred in payment for same exceeds any deal hitherto made in the interior of the province. Other very valuable claims exist, among them being the Silver Crown, owned by Messrs. Andrews & Fleming, of Seattle; and Stemwinder, Morning Star, Black Diamond, Wild West, claims by various parties. Camp McKinney, also in the same district, has a good property in the Eureka claim, which is being operated by the Douglass Mining Co., other important claims being Carbonate and Cariboo locations. Boundary creek has some remarkably good prospects, which have been opened up by Mr. Atwood and the Spokane & Great Northern Mining Co. Trial shipments of ore have already been made and proved very high grade. Many varieties of both silver and gold ore occur in this district, the Mineral King and Mountain Chief being free-milling ores. Kettle river and Priest lake have added to the known wealth of the district, and we look for a large development next year. The district of Osoyoos, like West Kootenay, is very easy of approach from the other side of the line and offers great inducements to prospectors, who find their field of operations too circumscribed south of the 49th parallel. The first continuous supply of gold bullion produced from quartz mined in this province promises to come from Osoyoos, which is no mean distinction. Trail creek is advancing steadily in the same direction. The ores from this camp contain as high as 7 per cent copper, but gold is the principal value. Several very important properties are mentioned as promising to make big mines, viz., the Le Roi, Center Star & I. X. L., O. K., Standard, Yellow Jacket, Josie, etc. The Le Roi and Center Star have been opened by tunnels over 200 feet long, and the development of the entire camp has been of the very best character. The future of Trail creek is assured, and as wagon-road connection is now had with Northport, on the Spokane-Northern railway, it is easy of access, which is no unimportant factor in the opening of a camp. A very promising gold find was made on Salmon river late last summer, which gives high average returns in free gold. The country, a small amount of placer gold, has attracted the attention of Nelson men as a possible gold-quartzfield. On Toad mountain and in the district of Nelson no new discoveries have been made, but it already has such properties as the Silver King, Dandy, Iroquois, Goldendale, Poorman, Whitewater and others, upon which a vast amount of work has been done. So far as yet known, the Silver King is without a peer, and when the hope which has been deferred so long is at last realized, this camp will at last take its proper place as a great mining center.

LOWER CALIFORNIA.

THE SAN FERNANDO SOLD.—The San Diego Union is advised of the sale to Denver capitalists of the great San Fernando copper mine in Lower California for \$250,000. Operations will begin at once for the production of copper ore. There is said to be \$75,000 worth of ore on the dumps now ready for smelting. The ore runs from 50 to 55 per cent copper. The mine had been worked on a large scale by Kelly and Woolridge of Mazatlan, who were offered \$1,500,000 for the property as it stood before their desertion of the country to escape capture for wholesale smuggling some years ago, since which time the property has been lying idle. The mine is situated about 100 miles south of San Quintin and 17 miles from the ocean, in a country bearing every indication of mineral richness. Dr. O'Clery, a former owner of the mine by virtue of a patent from the Mexican Government, retains an interest in the property. The sale was arranged by Gen. R. H. Rollins of Los Angeles.

MEXICO.

THE PROMONTORIO GROUP.—Nogales Advertiser, Jan. 20: The Promontorio group of 68 mines, including the famous Tumacacori mine owned by Mr. L. Ephraim of Nogales, is steadily producing and shipping ore. Mr. Ephraim has 65 men at work, extracting and developing different leads in the group. The mines are all within a radius of about one mile, and the ore runs from \$40 to way up in the hundreds, as the ore is assorted. This variety enables Mr. Ephraim to ship large quantities at any time. If silver is up, he ships the lowest grades; if down, the higher grades are selected. Even should silver value go to 75, Mr. Ephraim could still ship at a profit, having such large quantities of rich ore. The last several cars were sampled at \$210 per ton. The daily expenses are about \$250, the bulk of which is taken out of the well-stocked store at the mines. This store supplies about five hundred persons, and a large profit is realized from this source. About \$2000 of the money paid out at these mines drifts into Nogales. Mr. Ephraim is the heaviest mining tax-payer in Magdalena district, and many consider that he has the finest mining property in the State of Sonora, with possibly two or three exceptions.

SOUTH DAKOTA.

BLACK HILLS NICKEL DEPOSITS.—Black Hills Journal, Jan. 19: In conversation with a Pioneer reporter while in Deadwood, Sam Scott made some interesting statements concerning the nickel and tin deposits at Harney City and about four miles from Hayward. The nickel and tin deposits run parallel, and lie between Battle creek and Iron creek, and the company's

property embraces about 960 acres, on the nickel portion of which only assessment work has been done, although this has been enough to satisfy the owners that the deposit is rich and practically inexhaustible. The discovery of the nickel was made about 18 months ago, but the deposit was not opened in a rich portion and nothing was said of the matter at the time. About three weeks ago further work was begun, in other places along the vein, the result of which was to uncover an immense amount of high-grade nickel ore, on which the assays range from 15 to 110 pounds to the ton. As nickel is worth one dollar a pound at retail and 75 cents a pound wholesale, it will be readily seen that the find is a rich one. And in this connection it might be interesting to add that no nickel is at present being produced in the United States, and the only nickel mines known to be now producing are at Sudbury, Canada, and New Caledonia, and the ore of both places is said to be similar to that found at Harney City. One of the new uses for nickel is in the manufacture of armor plate and artillery guns, hence the market bids fair to be an extensive one.

UTAH.

THE SAN JUAN PLACERS.—A dispatch from Washington dated Jan. 25th says: Secretary Noble transmitted to-day, in response to a resolution of the House, his report concerning the executive order of Nov. 19th, by which that part of Utah west of the 110th meridian is restored to the public domain, together with all correspondence on the subject. The documents show that this land was thrown open to settlement for the purpose of allowing the people of the United States an opportunity of exploring the placer fields in search of gold and other valuable minerals. All of the facts connected with the restoration were published generally throughout the country at the time the President's proclamation was issued. A telegram was received from Colonel Hunt of the army reporting that no prospectors had intruded or were intruding on the Navajo reservation.

THE GOLD FIELDS.—Cocino (A. T.) Sun, Jan. 15: During the week a number of prospectors have returned from the San Juan placer fields and a number have brought in gold, and there is now on exhibition at Babbitt Bros.' some fine specimens of placer gold, and it is now conceded by the most skeptical that gold exists there in paying quantities and that in the largest sense of the words. A good many thousand dollars in gold have already been taken out, and it is what is known as flake and shot gold. It will, however, cost money, to get water on to the bars and to handle the dirt, but as it pays well, the money will be expended. Sam and Mat Black and Martin McCarty have returned; the latter is an old California prospector, and they located on the lower San Juan 20 miles above the mouth. Mac panned out three pans of dirt taken at the top and obtained about 90 cents in gold, and he says that the estimate placed on the placer ground is from five cents per pan to as many dollars. The party ran out of grub, and as soon as they rest up they will return and go to work again. There are three camps in the lower river, and all the valuable ground has been taken up, but back from the river and in the side gulches there is plenty of ground which is just as rich as that along the river. The Arizona & Utah Development Company are finishing up the road to their camp and will put in machinery and commence work as soon as the weather gets warmer. Ice is now running in the river and men cannot work in the water. Hugh Campbell and others have a number of claims below the A. & U. some 20 miles, and they have named the district the Golden Reef. They are putting in sluice-boxes and doing other preparatory work. Parties are going from here nearly every day and hundreds are going from Colorado, and parties who were sent out from Denver to make tests of the placers report that one test returned \$19.60 to the cubic yard of dirt, and another \$12.40. The Navajo Indians do not like the goldseekers to cross the reservation, and it is feared that there will be trouble with them. They cannot understand how a strip of land which they have always claimed can be taken away from them without their knowledge, and the crossing of the reservation of armed men makes them indignant, and it causes a feeling of resentment among them, and they may make it interesting for the white men. However, it is all the more interesting for the searchers for gold, for they think there is just as good chance of their losing their scalps as there is of finding gold.

WASHINGTON.

A NEW EL DORADO.—Spokane Chronicle, Jan. 20: John Blackburn, a prospector, called at the Chronicle office to-day and related a story of ore discoveries in the vicinity of Davenport, Lincoln county, which, if true, promises to equal, if not eclipse, the most sensational tales ever circulated about the late discoveries in the Slovan country. Blackburn is rather an intelligent-looking fellow, and tells his story with an air of seriousness which gives it weight. He carries a bag full of samples with him to demonstrate the truthfulness of his report. The Egypt district is the name of the newly-discovered El Dorado, and is situated about 60 miles north of this city on the Spokane river. Greenville Blake and Clarence McCullough are the names of his fellow-prospectors. Blackburn claims that the vicinity of Egypt is fairly studded with ridges of ore cropping out on the surface and bearing evidence of remarkable richness in mineral wealth. He was led to investigate the Egypt district from the report of an old-time prospector who had once struck it rich there, but had lost track of his find. Blackburn and his friends have located ten claims in the vicinity. The ore consists chiefly of galena, with copper and bromides of silver in abundance. Blackburn expects a big boom in his newly-discovered mining camp in the spring.

Market Reports.

Financial and Commercial Review.

SAN FRANCISCO, Jan. 26, 1893.

Gold Coin for New York.

A contemporary says that \$29,287,250 in gold coin was sent from this city to New York in the mails in 1892, against \$12,458,440 in 1891 and \$929,000 in 1890. It should be explained that of the large shipment last year \$20,000,000 was sent from the Sub Treasury, and consisted entirely of Government coin, the accumulation of years from the collection for duties on imports at this port, and that this large sum was conveyed across the continent by special train under a special guard of United States soldiers. It was thus altogether out of the usual order of remittance, and in no way represented a mercantile business. The same thing happened on a small scale in 1895, when gold coin shipments hence through the mails amounted to \$21,605,750.

Consumption of Tin in the United States.

During the last decade the consumption of tin in this country has nearly doubled, which is best proven by the yearly importations since 1882. Reducing the weight into round numbers of tons of 2,240 lbs, we find that according to the official returns from the Bureau of Statistics in Washington the total importations of tin in bars, blocks or pigs, "grain or granulated," have been as follows for each year, ending June 30th:

1882.	1883.	1884.	1885.	1886.
9,800	11,910	11,600	10,700	12,500 tons.
1887.	1888.	1889.	1890.	1891.
13,200	14,200	15,100	15,600	17,800 tons.

There is no official record of stocks, but taking those of New York, as the principal port of importations as a basis, viz:

1881.	1882.	1883.	1884.	1885.	1886.	
2,000	1,500	1,000	700	1,400	1,300	tons.
1887.	1888.	1889.	1890.	1891.		
300	1,600	900	1,600	1,700		tons.

The yearly consumption has been:

1882.	1883.	1884.	1885.	1886.
10,300	12,400	11,900	10,000	12,600 tons.
1887.	1888.	1889.	1890.	1891.
14,200	12,900	15,800	14,900	17,700 tons.

The consumption for the calendar year 1892 we figure as follows:

Stocks January 1, 1892.	2,000 tons
Importations for 11 months ending Nov. 3, 1892, as per official returns, reduced into round numbers or tons of 2,240 pounds.	19,500 tons
Importations during the month of December, 1892.	1,100 tons
Total.	22,600 tons
Stock on January 1, 1893.	3,500 tons

Consumption in 1892. 19,100 tons

American Copper Product for 1892.

The *Engineering and Mining Journal* of January 14th gives the copper product of the United States for 1892 as follows:

Lake Superior mines, lbs.	107,200,000
Arizona.	38,000,000
Montana.	164,300,000
All other States.	15,680,000
From imported ores.	10,200,000

Total. 335,380,000

The product in Montana was 51,000,000 pounds larger than in 1891. The Anaconda mine of Montana produced 63,000,000 pounds in the first six months of the year. At the beginning of 1892 there was a stock of 33,929 long tons. The amount exported in 1892 was 40,195 long tons, the amount consumed 118,472 long tons, leaving a stock of 25,000 long tons at the close of 1892.

THE METAL MARKETS.—There are no changes worthy of note in the local metal markets. Eastern advices are that the demand for pig iron is improving and prices are firmer. Sales are not hard to make at inside quoted rates, but buyers are still on the defensive and not disposed to buy in advance of requirements, while on the other hand sellers are not offering concessions unless under special circumstances. For steel billets the market is heavy and depressed.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	— @ 13	English, D.	— @ 18
Refined, in car lots	— @ 7 1/2	Canton tool.	— @ 8 1/2
Powdered, do.	— @ 7 1/2	Do, 1 1/2 ft. diam.	— @ 10 1/2
Concentrated, do.	— @ 6 1/2	Pick & Hammer.	— @ 10 1/2
All grades jobbing at advance.	— @ 6 1/2	Machinery.	— @ 10 1/2
COPPER.		TIN PLATE.	
Bolt.	— @ 22	B. V. steel grade.	— @ 5 1/2
Sheeting.	— @ 22	1 1/2 x 20, spot.	— @ 5 1/2
Ingots, jobbing.	— @ 14	Charcoal, 1 1/2 x 20.	— @ 5 1/2
Do, wholesale.	— @ 13	Do, roofing, 1 1/2 x 20.	— @ 5 1/2
Fire Box Sheet.	— @ 24	Do, do, 20 x 28.	— @ 11 1/2
IRON.		PIG TIN.	
Bar, base.	— @ 3	Spot @ B.	— @ 24
Norway, base.	— @ 4 1/2	COAL.	
PIG IRON.		SPOT FROM YARD—PER TON.	
Eglinton @ ton.	20 00	Wellington.	8 50
Glenbrook.	22 50	Greta.	7 50
Am. Soft, No. 1.	22 00	Nanaimo.	5 50
Oregon Pig.	20 00	Gilman.	5 50
Puget Sound.	20 00	Coos Bay.	5 50
Clay Lane White.	22 00	Cannel.	8 50
Langdon.	22 50	Egg, hard.	12 00
Thorncliffe.	23 00	Oumberland, in sacks.	15 50
Garthside.	22 50	Do, bulk.	14 00
Barrow.	22 50	Wallsend.	7 25
Carrofoot.	22 00	Scotch Splint.	7 50
CHROME IRON ORE.		Byrnabo.	7 50
Per ton.	20 00	West Hartley.	7 50
LEAD.		TO LOAD—PER TON.	
Pg.	— @ 4 1/2	Australian.	6 37 1/2
Bar.	— @ 5 1/2	Liverpool Steam.	5 50
Sheet.	— @ 5 1/2	Scotch Spill.	5 00
Pipe.	— @ 6 1/2	Cardiff.	5 12 1/2
SHOT.		LEIGH LUMP.	
Drop, sizes smaller than		Cumberland.	12 00
B. 3/4 bag of 25 lbs.	\$1 85	Egg, hard.	10 00
Do, do, B. and larger sizes		Do, in sack.	9 00
3/4 bag of 25 lbs.	2 10	West Hartley.	7 50
Buck, Bulls and killed		COKE.	
Do, 3/4 bag of 25 lbs.	2 10	English, to load.	\$3 50 @ 9 50
QUICKSILVER.		Do, spot, in bulk.	— @ 9 50
Home trade, pr.		Do, in sack.	— @ 9 50
Ask.	41 50 @ 42 00	Cumberland.	9 00
For export.	35 50 @ 38 00		

The Mining Share Market.

The mining share market has been a little better this week than last, but not very much. Matters are in an unsatisfactory condition on the Comstock, and, as will appear by an article in another column, a number of prominent men on the lode are discussing the situation with a view to certain reforms in improvements, mainly in the direction of reducing railroad freight, cost of water and cost of milling. These things should have been considered long ago, before affairs got to their present bad state.

Mr. Fox and the other stockholders of the Hale & Norcross Co., who got judgment against Alonzo Hayward, W. S. Hobart and others for \$1,011,835, have not yet got their money. After the judgment had been rendered and a receiver appointed to take charge of the property of the corporation, all of the defendants, with the exception of the estate of W. S. Hobart, perfected an appeal to the Supreme Court from the findings and decree of Judge Hebbard, holding the corporation and Hayward and Hobart jointly and severally liable for the judgment. Under the law, the defendants were required to put up a bond in double the amount of the judgment, which meant that they should justify in the enormous sum of \$2,022,000. On July 6th, just about a month after Judge Hebbard's decision, the Western Surety and Guarantee Company filed articles of incorporation under the laws of the State, with a capital of \$100,000, for the purpose of making, guaranteeing or becoming a surety upon bonds or undertakings required or authorized by law. The capital stock of the company was divided into 10,000 shares of \$10 each, which was fully subscribed by C. D. Lane, \$20,000; Isaac L. Regua, J. P. Jackson, W. E. Dean, G. B. Bowers and D. L. Bliss, each \$10,000; W. J. Dingee, \$15,000, and Ramon E. Wilson, \$5,000.

This company, which is supposed to have been organized to furnish the bond in the Hale & Norcross appeal case, had a small liability for such a big bond. The attorney for the receiver, J. J. Groom, in November last made a motion in the lower court to proceed upon the judgment as though no sufficient bond had been given. The defendants met this movement by going to the Supreme Court and filing a petition for a writ of prohibition restraining the lower court from proceeding in the case. The petition was heard on December 5, 1892, and has been sleeping in the court since. The men who got the judgment are anxious for a decision, but it is still delayed.

At the annual meeting of the stockholders of the Del Monte Mining Company, 187 1/2 shares were represented out of 225 1/2, and the following officers were elected for the ensuing year: E. Scott, president; F. A. Berlin, vice-president; and P. C. Hyman, G. W. Grayson and Thomas B. Pheby, directors. J. W. Pew was re-elected secretary, and his financial statement showed an indebtedness of \$20,824.33.

At the annual meeting of the stockholders of the Utah Mining Company 81,885 shares were represented and the following officers elected for the ensuing year: H. B. Havens, president; George R. Wells, vice-president; Herman Zaidig, A. S. Wallberg and E. B. Holmes, directors. A. W. Havens was elected secretary, vice A. H. Fish. The secretary's financial statement showed a credit of \$1781.20.

At the annual meeting of the stockholders of the North Commonwealth Mining Co., 83,656 shares were represented, and the following officers elected for the ensuing year: E. Scott, Pres.; F. A. Berlin, Vice-Pres.; and P. C. Hyman, G. W. Grayson and Thos. B. Pheby, Directors. J. W. Pew was re-elected secretary, and his financial statement showed a credit of \$1713.34.

It is rumored, says the *Reno Gazette*, that all the mills on the Carson river, with one possible exception, will close down in a few days.

Eastern Silver Markets.

NEW YORK, Jan. 26.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.
Thursday.	32 1/2	83 1/2
Friday.	32 1/2	83 1/2
Saturday.	32 1/2	83 1/2
Monday.	32 1/2	84
Tuesday.	32 1/2	84
Wednesday.	32 1/2	83 1/2

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, JAN. 26, 1893.

9:30 A. M. SESSION.

100 Belcher.	80c	100 Gould & Curry.	80c
200 Best & E.	75c	100 Hale & Norcross.	75c
70 Bullion.	65c	100 Mexican.	1 1/2
205 Challenge.	35c	150 Oplir.	1 1/2
150 Con. Cal. & Va.	2 55	100 Potomac.	1 1/2
50 Crown Point.	50c	100 Savage.	1 1/2
50 Esch.	10c	100 Yellow Jacket.	55c
2:30 P. M. SESSION.			
50 Alta.	15c	150 Gould & Curry.	80c
200 Andes.	15c	200 Hale & Norcross.	80c
100 Belcher.	80c	310 Kentuck.	10c
150 Best & E.	75c	150 Oplir.	1 1/2
500 Bullion.	65c	150 Potomac.	1 1/2
400 Con. Cal. & Va.	2 40	100 Savage.	1 1/2
100 Crown Point.	50c	50 Union.	1 1/2
100 Esch.	10c	50 Union.	90c

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

HOISTING AND CONVEYING MACHINERY.—Frank C. Beach, S. F., assignor of one-half to Louis Rosenfeld, N. Y. No. 489,785. Dated Jan. 10, 1893. The invention relates to that class of mechanism designed for hoisting material from a given point, conveying it thence to another point and there lowering it. The object of the invention is to provide simple and effective means capable of easy and accurate operation, for hoisting coal and other material from given stations, conveying it rapidly to another station, and there lowering and deliv-

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		ASSESSMENTS.		SECRETARY.	
Alpha Cons M Co, Nevada.	10	10c	Dec 20, Jan 24, Feb 14	O E Elliott, 309 Montgomery	
Andes M Co, Nevada.	30	2c	Jan 21, Feb 14, March 16	J W Tiggs, 309 Montgomery	
Belle Lile M Co, Nev.	17	10c	Jan 8, Feb 14, Mar 5	J W Pew, 310 Pine	
Best & Belcher M Co, Nevada.	58	2c	Jan 16, Feb 21, March 14	L Osborn, 309 Montgomery	
Carra M & M Co, California.	2	81	Dec 19, Jan 23, Feb 17	C C Coleman, 16 Fremont	
Confederate S M Co, Nev.	22	75c	Dec 24, Jan 26, Feb 15	A S Groth, 414 California	
Cons California and Virginia M Co, Nevada.	3	50c	Dec 13, Jan 21, Feb 10	A W Havens, 309 Montgomery	
Cons Imperial M Co, Nevada.	31	5c	Nov 22, Jan 18, Feb 5	C L McCoy, Mills Building	
Crocker M Co, Arizona.	13	5c	Jan 16, Feb 21, March 15	A Waterman, 309 Montgomery	
Crown Point M Co, Nevada.	59	25c	Dec 20, Jan 24, Feb 14	J Newlands, Mills Building	
Crocker-McK M Co, California.	3	10c	Jan 6, Feb 10, March 3	J W Pew, 310 Pine	
Evering Star M Co, California.	7	10c	Dec 6, Jan 12, Jan 31	J J Scoville, 320 Sansome	
Gold Mountain M Co, Cal.	4	5c	Dec 21, Jan 23, Feb 15	P Curtis, 359 Montgomery	
Hale & Norcross M Co, Nev.	103	50c	Jan 7, Feb 10, Feb 28	A B Thomson, 309 Montgomery	
Jack Rabbit M & M Co, Nevada.	2	5c	Dec 23, Feb 6, Feb 28	T Wetzel, 320 Sansome	
Justus M Co, Nev.	53	10c	Jan 6, Feb 9, Mar 2	R C Kelly, 419 California	
Martin White M Co, Nevada.	23	25c	Nov 23, Jan 16, Feb 20	N L Ross, 120 Sutter	
Nevada M Co, Nevada.	24	10c	Jan 9, Feb 13, March 7	J W Pew, 310 Pine	
Nevada Queen M Co, Nevada.	8	100c	Jan 23, Feb 27, March 20	R E Grayson, 331 Pine	
Overman M Co, Nevada.	64	25c	Jan 10, Feb 14, Mar 7	G D Edwards, 414 California	
Pear M Co, Arizona.	11	5c	Jan 20, Feb 24, March 21	A Waterman, 309 Montgomery	
Peerless M Co, Arizona.	19	5c	Jan 20, Feb 24, March 22	A Waterman, 309 Montgomery	
Seg Belcher & Miles M Co, Nev.	1	25c	Jan 5, Feb 7, Feb 27	E B Holmes, 309 Montgomery	
Shakyou Cons Quicksilver M Co, California.	1	1c	Dec 16, Jan 20, Feb 10	E F Stone, 305 Pine	
South Eureka M Co, Cal.	2	2c	Jan 4, Feb 10, Mar 6	A Halsey, 338 Montgomery	
Union Cons M Co, Nevada.	16	10c	Dec 13, Jan 17, Feb 9	A H Ward, 508 California	
Weldon M Co, Arizona.	6	50c	Jan 16, Feb 20, March 14	A H Clough, 103 Sansome	
Yellow Jacket S M Co, Nevada.	53	30c	Dec 5, Jan 10, Feb 14	W H Bianvelt, Gold Hill	

COMPANY AND LOCATION.		MEETINGS. SECRETARY AND OFFICE IN S. F.		DATE.	
Belcher M Co, Nevada.	Annual.	C L Perkins, Mills Bldg.		Jan 31	
Chibola Creek M Co.	Annual.	L Osborn, 309 Montg'y.		Feb 6	
Natoma Water & M Co, California.	Annual.	A H Ward, 508 California.		Feb 20	
Pacific Coast Borax Co, California.	Special.	A H Clough, 103 Sansome.		Feb 18	
Southern Cal Coal and Oil Co, California.	Annual.	W G Mugan, 10 California.		Feb 8	

COMPANY AND LOCATION.		DIVIDENDS.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Bulwer Cons M Co, California.	5	10c	Oct 20	L Osborn, 309 Montgomery		Oct 20	
Obamption M Co, California.	10	2c	Dec 19	T Wetzel, 320 Pine		Dec 19	
Great Western Quicksilver M Co.	25	A Halsey, 328 Montgomery	Oct 8			Oct 8	
Mayflower Gravel M Co, California.	10	D H Ward, 508 California.	Dec 20			Dec 20	
Pacific Coast Borax Co, California.	1	A H Clough, 103 Sansome.	Jan 10			Jan 10	
Standard Cons M Co, California.	10	J W Pew, 310 Pine.	Dec 23			Dec 23	

ering it gently, whereby breakage is avoided. The invention consists in the novel construction, arrangement and combination of the traveling trolley and the means for operating it and hoisting and lowering the bucket or tub to and from said trolley.

FILTER.—Joseph Kraker, S. F. No. 489,747. Dated Jan. 10, 1893. This invention relates to improvements in filters, and consists in the arrangement of a body of filtering material within an outer enclosing case, with pipes and cocks so arranged that the flow of water through the filter may be reversed at pleasure, both for the purpose of cleaning the filtering surfaces first exposed to the inflowing water and also to filter in the opposite direction when deemed desirable. In connection with these various flow-cocks is another, through which the water may be drawn directly and without filtering. In connection with the filtering devices is a reservoir chamber to receive and store filtered water, and a float-controlled valve is fixed to operate between the filter and the reservoir.

GANG-PLOW.—A. F. McMillan and Thos. Gormley, Benicia. No. 490,210. Dated Jan. 17, 1893. The general object of this invention is to simplify and cheapen the construction of gang-plows, at the same time making them strong, durable, and easily adjustable. The patent covers certain novel features of construction.

AUTOMATIC RELEASING DEVICE.—Hans P. Nielsen, Alameda. No. 490,211. Dated Jan. 17, 1893. The object of this invention is to provide a releasing device simple in construction and operation which can be applied to the releasing of hitched animals, such as horses in fire-houses and livery stables, or to spring-controlled doors or other structures which may be required to be automatically and quickly released. The device is one of that class in which a swinging bar is controlled by a catch operated by the armature of an electro-magnet.

HYDRAULIC-MINING APPARATUS.—Newton C. Miller, French Corral, Nevada Co. No. 489,751. Dated Jan. 10, 1893. Various devices have been used in the attempt to raise gravel and other gold-bearing earth from points where it may be deposited to higher elevations, by the use of a jet of water under pressure, the operation being performed by introducing the jet nozzle into a closed sluice or pipe, so that the velocity of the water will carry up the dirt or gravel which is deposited so as to be acted upon by the stream. The great difficulty encountered in this apparatus has been the clogging up of the discharge-pipe by reason of so great an amount of

heavy material accumulating in it that the momentum of the jet is checked that it will not operate. This invention is designed to overcome this difficulty by introducing, along with the jet of water, a current of air which prevents the choking of the material within the pipe. It also consists in the novel arrangement and construction of the parts of the apparatus. The inventor states that it is especially useful in cases where the gravel or earth is brought in sluices to points so much below the surface of the bedrock that further work cannot be done without first raising it sufficiently to allow another sluice to be put in.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JAN. 17, 1893.

490,133.—EEO-CUTTER—E. Berrini, Tacoma, Wash.	
490,137.—FLOOD-GATE—H. A. Corliss, St. Helen, Ogn.	
490,016.—FURNITURE CASTER—J. Elwood, Sanger, Cal.	
490,017.—WAGON-JACK—A. J. Galindo, Concord, Cal.	
490,071.—WHIFFLETREE COOLING—E. S. Gentry, Panaca, Nev.	
490,197.—HARVESTEE BEAKE—C. Grattan, Stockton, Cal.	
489,958.—LOUNGE—A. Jansen, S. F.	
489,969.—CAN-BODY FORMING MACHINE—A. W. Livingston S. F.	
490,027.—VENTILATOR—C. W. Lochman, Crescent City, Cal.	
490,159.—SKETCHING DEVICE—T. A. McFarland, Portland, Ogn.	
490,210.—GANG PLOW—McMillan & Gormley, Benicia, Cal.	
490,031.—CAMERA-SHUTTER—E. J. Molera, S. F.	
490,211.—RELEASING DEVICE—H. P. Nielsen, Alameda, Cal.	
490,043.—HAND-TROCK—Rayburn & Bell, San Jose, Cal.	
490,214.—DEAFTH EQUALIZER—P. V. Schandoney, Sacramento, Cal.	
489,989.—TOO-CLIP FOR HAMES—J. Scott, Bethany, Cal.	
490,215.—ROCK-CROSHER—Simmons & Holmes, S. F.	

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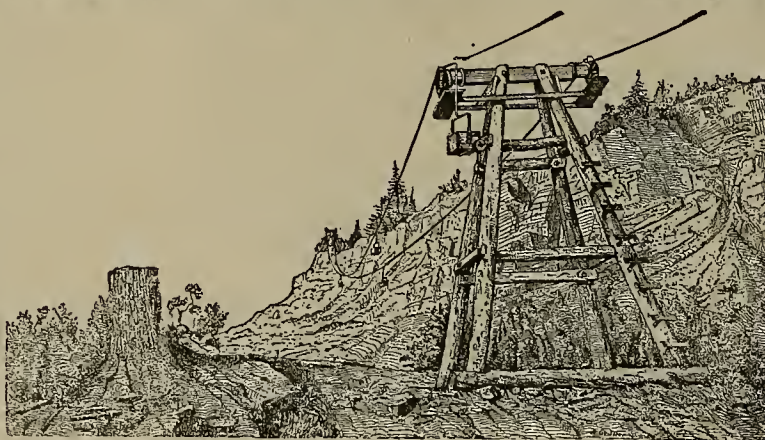
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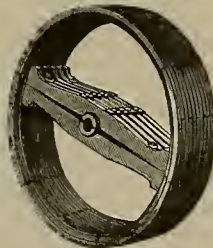
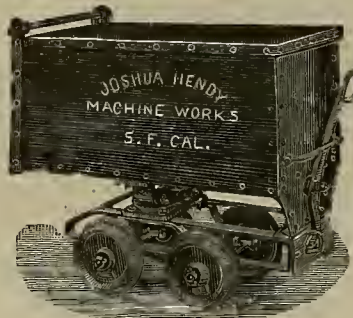
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VOL LXVI. - Number 5.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 4, 1893.

Three Dollars per Annum
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Lidgerwood Improved Hoisting Engines for Mines.

The latest improvements made by the Lidgerwood Manufacturing Company, 96 Liberty street, New York, are embodied in their new single and double drum mining engines.

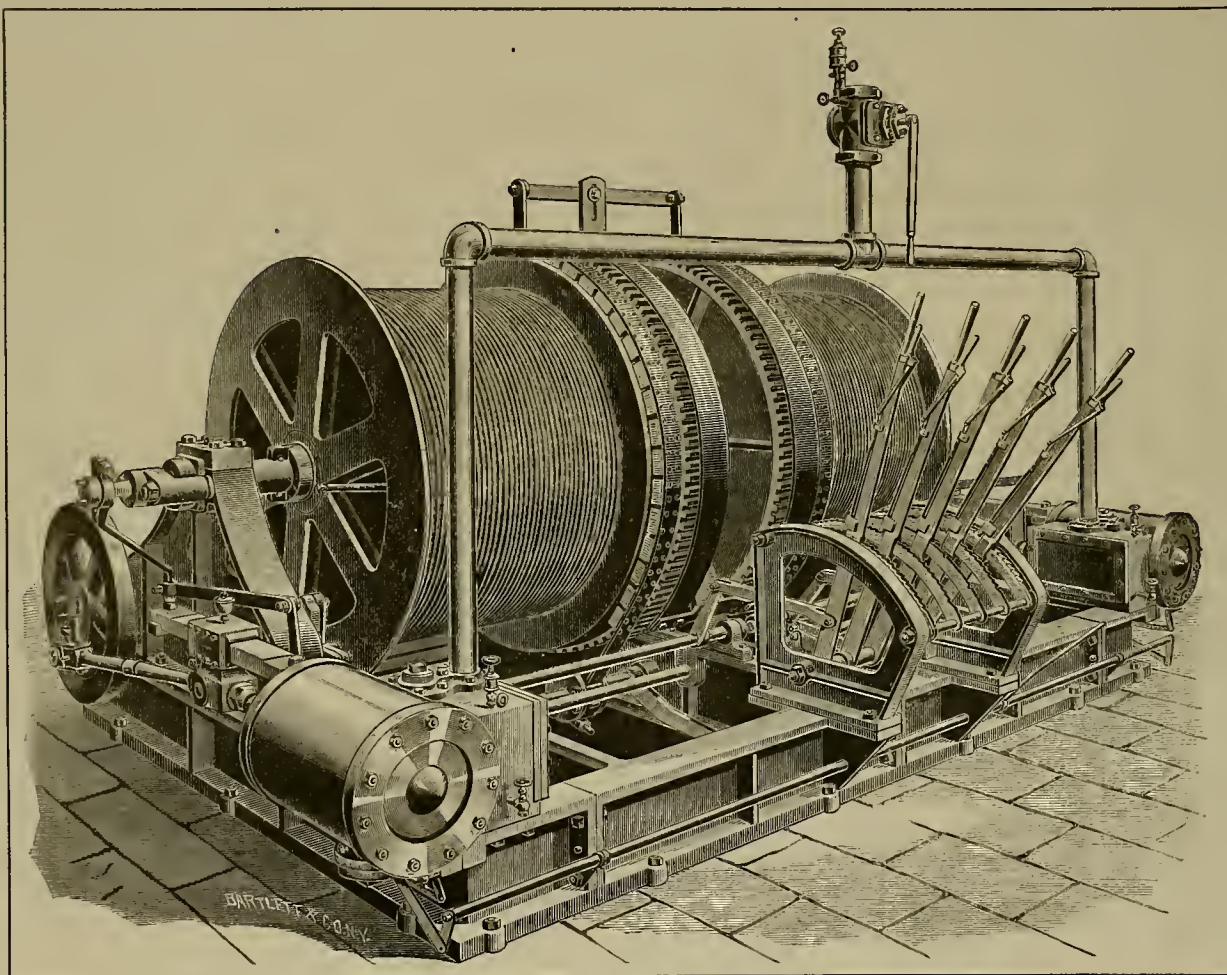
They are of the well-known form of friction drum engine of the Lidgerwood type, having two separate engines connected to the crank shaft, with cranks set at an angle of 90 degrees. On this crank shaft there is a small pinion which meshes with a large gear wheel, the proportions being from five to one to six to one. This large gear wheel is keyed fast to the drum shaft. On the side of this gear wheel is bolted wooden segments in the form of a double V. The drum is arranged to be loose upon the shaft or to be thrown into friction when it is to take the motion of the gear. It is unnecessary to describe the method of throwing in this friction. It is of a well-known type which has been used for many years, the only improvement being one of proportion. The drum has a differential brake lined with blocks of wood fastened to the band by means of leg screws. The engine has reversible motion, and the lever for operating the links, as well as the lever for operating the brake and the friction, are all brought together in a central position. This arrangement of levers is considered a very great improvement, and has been adopted on all of the Lidgerwood Company's mining engines.

This improved style of engine, it is claimed, unites all the good qualities of the reversible engine, as well as the friction drum engine, and therefore may be used for all work requiring either of these engines. In a single shaft, all the hoisting of ore may be done by the engine in the usual way, and the empty car or bucket lowered by means of the brake, while for hoisting and lowering the men the drum may be thrown into gear and the engine used as a reversible engine, handling the load entirely by steam.

It being a reversible engine, the links may be hooked up after the load is started, cutting off steam at any point of the stroke desired, thus doing most of the work by its

expansion in the cylinders, while by lowering by means of the friction drum end brake the engine does not run and therefore uses no steam.

A valuable feature of this engine is, that while it is designed mainly for single shaft work, it can also be used on a double shaft by simply throwing the friction into gear permanently and using it as a reversible link-motion engine, hoisting the cage and load in one shaft, and at the same time lowering the empty cage in the other shaft.



LIDGERWOOD IMPROVED DOUBLE-DRUM HOISTING ENGINE FOR MINES.

The description of the double drum engine is the same as that of the single drum, the point of difference being that two drums are used instead of one, both absolutely independent of the other; hence, in operation, the same work can be done as though two of the single drum engines were used. These drums may be thrown into and out of gear while the drums are in motion, either separately or together, or one may be lowering while the other is hoisting, or both drums may be thrown into gear and the engine used as a regular reversible engine.

The Lehigh Zinc & Iron Company, we are informed, has been using an engine similar to the double drum engine shown, near Franklin, in the celebrated Franklin Furnace zinc mines. The size of the cylinder is 14x18; the drums are 66 inches diameter and 66 inches face, the whole engine weighing about 50,000 pounds.

THE Rothschild syndicate has borrowed \$10,000,000 in gold in the United States for the use of Austria to aid in her currency reform.

The Sewerage Commission Abolished.

The San Francisco Sewerage Commission, recently appointed, has been summarily abolished by the new Board of Supervisors. The members were Col. Geo. H. Mendell, Prof. George Davidson and Irving M. Scott, with Messrs. Manson and Grunsky as engineers. Since last June, the time of their appointment, many miles of surveys have been made, several sewer systems have

been established and numerous street grade lines have been defined. It is generally understood that the abolition of the Commission was brought about because its existence kept certain fees and percentages out of the pockets of the city and county surveyor. So again we have "politics" to the front in the matter of sewers, and San Francisco must continue without any comprehensive system. This is but a repetition of all public work in this city. For years the necessity of a complete general sewersystem has been recognized, and when this commission of eminent engineers was appointed it was thought that at last something would be done in the proper way. But when about fairly at

work, the gentlemen were displaced without notice and without courtesy of any kind being shown them, in order that officials might obtain certain fees. The members of the commission did not seek the office, and were, perhaps, rather glad to be relieved of the responsibilities, but the action of the supervisors is none the less discourteous. It is true that the supervisors resolved that the work of the commission be continued under the supervision of Engineer Marsden Manson and such assistants as may be required, under the control of the Committee on Streets and the city and county surveyor. Mr. Manson's salary was reduced from \$400 to \$250 per month. His duties are not defined and he is under the control of a committee and a city official. Mr. Manson said that he did not desire to accept the work under the resolution as passed. The order was too indefinite. It divided the responsibility and the duties, and such division in the past has been the cause of a great deal of defective sewer work in this city. It is decidedly unfortunate, in our opinion, that the commission was not continued.

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Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, February 4, 1893.

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Comment.

The manufacture of common powder and high explosives is a very important industry in this State and large capital is invested in the plants. Immense amounts of powder are made and sold throughout the coast. It is also shipped away to Mexico and other foreign countries. Great quantities are used in mining, railroad building, quarrying, etc., and this branch of manufacture has become among the most important we have here. It will be well, therefore, for the Legislature to look carefully into the subject before attempting to pass such laws as will so restrict the business as to drive it away. It is all very well to place some restrictions on powder manufacture with relation to the location of works near cities and towns. There can be no objection to that. A bill now pending, however, in the Legislature prohibits the manufacture of powder within four miles of any city, town or village, railroad or public road. The factories must ship their products by road or railroad and by sea and must have ordinary facilities for carrying on business. There is no necessity for driving them out of business on the plea of regulating the location of the works. We have all too few manufactures in and near this city, as it is, and should encourage instead of discouraging them. There can be no objection to reasonable restriction in the location of powder works, but the Legislature should exercise some judgment in the matter. There are no places on the bay shore where works could be built and yet be five miles from a railroad or public road.

Senator T. L. Ford, of Sierra Co., has introduced in the legislature a bill, entitled an Act to amend the civil code by adding thereto two sections, to be known as sections 1424 and 1425, being title IX, part IV, Division 11 of the code, concerning the manner of conducting the business of hydraulic mining. The proposed sections are as follows:

Sec. 1424: The business of hydraulic mining may be carried on within the State of California wherever and whenever the same can be carried on without material injury to the navigable streams, or the lands adjacent thereto.

Sec. 1425: Hydraulic mining, within the meaning of this title, is mining by means of the application of water, under pressure through a nozzle against a natural bank.

The first of these sections is in line with recent decisions of the U. S. Circuit Courts, which permits this kind of mining to go on where no damage results. If damage can be proved work will have to stop. The second section is a very terse and well-worded definition of hydraulic mining. There should be no objection whatever to the passage of this bill since no change is made in existing conditions such as would be detrimental to opposing interests.

At a meeting in London the directors of the San Jacinto estate (Temescal tin mine) decided to wind up the con-

cern, and let it pass into the hands of the holder of the first debenture bonds. This is the end of the English tin-mining company's operations in this State. Last week the sheriff sold at auction a quantity of the movable property of the company to satisfy the accounts of parties to whom the company was indebted when the mine was closed down some months ago. The closing of the mine was a serious loss to the merchants of the section, as well as to labor, as the company, during the time the mine was in operation, disbursed many thousands of dollars monthly. Of course those who took the first bonds now own the property and may eventually utilize it, but, for the present at least, operations in the mine have ceased. The thousands of people in England who invested in this mine have lost their money entirely, the company having decided to "wind up." Too much was paid for it in the first instance, and this may be really a job on the part of the insiders to get it at a reasonable figure. But this is small comfort to those who invested on the representation of the promoters. The mine was never much more than a prospect, and there was never much money spent directly upon it to prove its worth. Thousands were spent on irrigation and agricultural projects on the estate, but the mine itself has not yet been properly tested. Some tons of tin were produced, but no systematic efforts were made to "go to the deep" for more extended deposits. This may have been all part of a plan, as some suspect, or it may have been just mere stupidity. At all events, the bondholders get the estate, mine and all. Part of the land, if sold, would return all the bondholders ever paid, and they would have the mine and works and some thousands of acres of land left. It is very unfortunate for this tin mine that it should have been made, in some sort, a political issue. The failure now will emphasize what was said of tin-mining during the recent campaign. At the same time, as we have said, the mine itself was never given a fair chance. There may be extensive deposits of good tin ore, for all the miners know. With the abundant capital at hand, deep and systematic explorations should have been made, instead of rushing things on the surface to produce a few tons of marketable tin. This failure will be set down against California mines, and adds another to the list of those which discourage the investment of British capital in this State.

No definite action has been taken by Congress with reference to the Caminetti hydraulic-mining bill. Judge Niles Searles has arrived in Washington on behalf of the California Miners' Association, and thinks the bill will probably pass the Senate in a few days. No attempt will be made to further amend the bill by the Senate committee, but it will be amended in conference. The idea of the miners is to modify the penalty clause so it will not be enforced until the Government Commission is organized and ready to issue licenses to mine. As the bill now stands, mining would have to stop where being carried on legally, and it may be a year before the Commission is ready to grant licenses. Of course, the delay jeopardizes the passage of the bill, a fact very well understood by the miners; but most of them prefer no new law at all to one drawn as this is at present. The San Francisco Chamber of Commerce has indorsed the action of the Miners' Association in asking for a modification of the Berry amendment. The following resolution explains the action of the Chamber:

January 25, 1893.

The Board of Trustees of the Chamber of Commerce of San Francisco in session this day.

Resolved, That we concur in and fully indorse the efforts of the Executive Committee of the California Miners' Association in their efforts to secure the passage by the Congress of the United States of the measure known as the "Caminetti Mining Bill," with amendments and penalty clause, as now pending before the Senate, excepting that the compulsory clause of section nine of said bill and the penalty clause recently added thereto shall not become operative until the commission provided for in said bill shall have matured their plans sufficiently to specify those hydraulic mines which are now prepared or in a position to operate without damage to navigable streams, and we urge our Senators and Representatives to so amend the said bill that mining interests already in operation shall not be forced to stop, but should continue to operate under existing laws pending the investigation.

A true copy. Attest: THOS. J. HAYNES, Secretary.

[SEAL]

The foundryman and mechanics of this city are interested in the Hawaiian annexation question to a certain extent, since, should these islands come under the American flag there would be a large extension of our commerce and trade in that direction. We have already profited to a considerable extent in the enterprises in Hawaii, since boilers, water-pipes, sugar machinery, engines, etc., needed there are mainly made in this city. With the protection of the American flag and the resultant immediate enlargement of the sugar interests of the islands, there would come extensive demands on our local foundrymen and manufacturers cheerful to contemplate, more especially in view of the prevailing dullness. Our local ship-building interests also would feel the effects; and, if the islands were annexed, this country would have to maintain more men-of-

war on this coast at all times, all of which would be good for local business. Whatever the opinion of the rest of the country may be, California would be very glad to see the stars and stripes waving over Hawaii.

In another column of the PRESS will be found the full text of Senator Ford's bill now pending in the Legislature and providing for a State Debris Commission. The sum of \$250,000 is to be appropriated for the purpose of building dams to keep back the debris in the rivers, but this is only to be available in case the Government appropriates a like sum; otherwise no expenditure is to be made. Senator Ford's idea is to be prepared for the passage of the Caminetti bill, which looks to the appointment of a State Debris Board to consult with that of the U. S. Government. Unless the Government takes some action in the premises, the State takes none. Senator Ford's bill will doubtless provoke some opposition from valley men, as does any measure connected with mining debris; but as it is intended to keep back debris now in the rivers they ought to support the measure instead of opposing it. It is intended to appoint only one Commissioner so as to lighten expense, but he should be a mining engineer of first-class standing, competent to advise with the army engineers who will compose the U. S. Commission.

California miners should remember that the State law requires them to record with the county recorder of the county where their claim is situated an affidavit that they have performed the annual assessment work required by the U. S. laws. The affidavit must describe the labor performed and improvements made, and the value thereof, which affidavit is prima facie evidence of the fact therein stated. The law states that failure to make this record within 30 days leaves the claim open to relocation. Whether such a provision can be enforced is doubtful, since the claim is taken from Government land, and the assessment work is a Government requirement, with which the State has nothing to do. However that may be, it will be well for miners to record the work done up to Jan. 1st. If they have not yet recorded the work, they will be outside the 30-day time limit, but should do it even now to save trouble. The idea is a good one to have this work recorded, and the U. S. laws should have made such provision. As matters stand now, there is no official way of finding out whether the year's work was ever done or not, and this stands frequently as a bar to titles of claims and prevents their sale.

ARGUS GOLD CAMP.—J. B. Skewes, formerly a mining superintendent at Bodie, has been in the city during the week purchasing machinery to take down to the new Argus camp. He obtained a Kendell one-stamp mill, gasoline engine, assay outfit, etc. The mines are 80 miles from Mohave and about 60 miles from the line of the Carson and Colorado railroad. The nearest mining settlement is Darwin, in Inyo Co. In the new camp water is scarce, or larger machinery would have been purchased. That which has been procured will be in operation in about three weeks. Argus is a gold camp in the Argus mountains, with good grade ore running from \$20 to \$50 per ton.

GEORGE SPAULDING, the well-known printer, who died in this city last week, was employed as foreman on the MINING AND SCIENTIFIC PRESS during its earlier history. In 1869 he and Harrison Barto bought out the MINING AND SCIENTIFIC PRESS job-printing department, which they developed into an extensive business now conducted by the corporation of which Mr. Spaulding was the head. Mr. Spaulding was a director of the Mechanics' Institute for 14 years and very prominent in Masonic fraternities. He was a very popular man, earnest in everything he undertook, thoroughly honest and upright, and one who will be greatly missed by his friends and associates.

THE MINING BUREAU REPORT.—Assemblyman Shanahan has introduced a bill calling for an appropriation of \$10,000 for the printing and issuance of the Eleventh Report of the State Mineralogist. The report referred to is that already prepared, but which the board of examiners referred to the legislature as too voluminous. They made no criticism on the contents, but thought more careful editing would have greatly reduced its bulk without injuring its utility.

A CORPS of United States Coast Survey officers is at Santa Monica and will immediately proceed to survey the harbor and vicinity, which is made necessary by reason of the Southern Pacific company having built a wharf here.

THERE is some talk of moving the Anaconda smelter to Great Falls, Mont., where there is plenty of water and power.

SALT LAKE CITY is to have a silver convention or congress on June 5th, 6th and 7th of this year.

The State Mining Bureau Should be Maintained.

Assemblyman Julius Kahn of this city wants to abolish half a dozen State commissions and consolidate several others, and he has an earnest supporter in Senator Langford of San Joaquin—one of the few counties of the State where there are no mining interests. Naturally both these men want to abolish the State Mining Bureau, probably knowing little or nothing about it and having no interest in its work or purposes. In speaking of the State commissions and his ideas of abolishing them, Senator Langford the other day said: "The most vicious of all these commissions, however, is the State Mining Bureau. Why, its printing bill alone is over \$10,000 every two years." The criticism of a purely agricultural county man on a mining bureau can scarcely be worth much or carry any weight. In the view of such a man the expenditure of \$10,000 for printing a report on mining work would seem "vicious." The idea of excessive cost of printing reports is not original with him, however. The Governor himself, in his official message to the legislature, called attention to the total lack of editorial work in the Mining Bureau report, and said a more careful preparation of the manuscript would save a great deal of money. He had some suggestions also with reference to the improvement of the method of conducting the bureau. He did not, however, suggest the abolition of the institution. So far from doing this he wanted to see the powers of the trustees enlarged, with a view of securing better results.

Neither Assemblyman Kahn nor Senator Langford have any reputation as mining men that we ever heard of. If some man from a mining county, with practical experience on the subject, will formulate a bill embodying Governor Markham's expressed ideas concerning the bureau there will be beneficial results to the institution and the mining industry. The mining men in the legislature, however, should resent the interference of men ignorant of their industry in anything which affects it. The Mining Bureau can very easily be made more efficient than it has been, but there is no necessity of abolishing it. The Bureau is the only institution maintained by the State for the benefit of the great industry which built it up. It would be better to improve than wipe it out of existence.

The trustees who form this commission get no salaries and have no patronage. A very extensive museum is maintained for the public; and an annual report is published giving the results of the work accomplished by the State Mineralogist and his assistants in the field. As long as the miners want this Bureau they should have it, and it would be but graceful for others to leave any suggestions concerning it to the class for whom it is intended.

Foundry Notes.

A. P. BRAYTON, President of the Pelton Water Wheel Co., has returned from a business visit to New York.

WORK is progressing rapidly on the new buildings for the Fulton Iron Works at Harbor View, a large force of men being engaged. The foundry building is completed, with the exception of the corrugated iron roof. The core ovens and brass furnaces are completed, and the smokestack for the main furnaces is up. The machine-shop building is well under way and will be completed within two weeks. It will not be more than a month before the whole new plant will be in order. The machinery, some of which is on the spot, will be of the latest patterns and designs.

It is probable that in the construction of the new ferry depot and the new postoffice the Pacific Rolling Mills will come in for a good share of work. The girders, beams, etc., which will be necessary, must be large and heavy and as the Rolling Mills are equipped to turn out just such work, it will naturally come to them. Mr. Edbrooke, the supervisory architect of the Treasury, in company with the inspector of public buildings, visited the Rolling Mills and Union Iron Works last week to get an idea of the kind of work turned out and the capacity of the plant for heavy beams.

THE Skeena river cold-storage plant, for fish, etc., is very successful, and the Vulcan Iron Works of this city, which built it, among others, will soon have more orders for similar ones. The Skeena works are particularly adapted for fish, and many carloads of fish have been shipped away since the plant was established. Mr. C. J. Koefed went up from this city and superintended the erection of the plant, on behalf of the Vulcan Works. A series of rooms are arranged with shelves upon which the fresh-caught fish are placed, and by means of a number of pipes containing ammonia in a gaseous form the temperature is lowered from 12 to 20 degrees below freezing. In a few hours the fish are frozen solid and can be handled like so much cordwood. The machinery necessary to accomplish this is of a very simple nature, consisting essentially of an engine and the ammonia condenser with the series of pipes. The air is forced out of the pipes and the vapor from the condenser takes its place, and by absorption produces a temperature which keeps the pipes continually covered with a thick coat of frost. Among the advantages of the system are, the fact that there need be no longer an idle season, for as soon as the salmon run is over other fish can be handled to advantage. Vessels need not wait for a cargo of fish, which loses much in quality while being collected, as now the frozen fish can be loaded on it in a few hours from the store-room and reach the market with all its original flavor and freshness preserved. A large quantity can be collected and held for transportation, when opportunity is afforded, and in many other ways the new system is bound to be successful. Arrangements have been made to secure transportation suitable to the growth of business, and this new branch of the fisheries trade bids fair to become a very important one.

Coast Industrial Notes.

A LARGE plant is to be established at Kalama, Wash., for the purpose of freezing sturgeon. Its capacity will be twenty-four tons of fish every twenty-four hours.

THE steamer Emily took away Wednesday a 43-ton locomotive for the Coos Bay and Roseburg Railroad, to run on the 22 miles of road already in operation between Marshfield and Coquille City.

AN ice factory, to be built by Eastern capitalists, is the next manufacturing industry to be established at Petaluma. It will probably be established and in running order for the coming summer.

The big bridge which the Southern Pacific company has been building over an arroyo to the north of their present track and a few rods from the bridge which crosses the Colorado river near Salton is completed. This bridge and track do away with all possibilities of a washout such as occurred in February two years ago.

THE directors of the Linda Vista irrigation district, San Diego county, this week opened bids for the purchase of \$840,000 worth of bonds. There was only one. It was from Wade & Cooper, representing one of the largest syndicates of bond-buyers in the United States, and was an offer of 90 cents on the dollar. It was accepted.

The first silk woven into goods in San Diego county has just been completed by Mrs. Lou Perin of Coronado, to be used for the World's Fair banner. She is now at work weaving a hundred yards of silk from cocoons raised at San Diego, which will be made into dresses as soon as completed.

THE California Oil Works have purchased a lot on University avenue, Berkeley, adjoining Neihaus' planing mill, and are tearing away the building thereon preparatory to the erection of a large brick building. It is rumored that the manufacture of coconut oil will be carried on. Some of the machinery is already on the ground.

ONE of the largest cement ditch contracts ever undertaken in San Bernardino Co. is now rapidly nearing completion. The Gage canal, which furnishes the water supply for the new settlements of Riverside, will be cemented for a distance of six miles. Gray Brothers' of Los Angeles have the contract, and a large force of men and teams has been employed in the work for many weeks past.

THE Monterey has been towed to Mare Island from the Union Iron Works by two tugs. Ammunition and supplies were put aboard her and she was formally received by the Government. Naval officers concur in the belief, however, that she will be kept here to defend San Francisco in the event of trouble with England or any other foreign power.

THE contract for the construction of the South Gila canal has just been let to Irland & Vickry of Los Angeles. The work when completed will cost \$2,000,000. The main canal will be seventy miles long with an average flow of six feet of water and will cover 161,000 acres of land. This is high mesa land on the south side of the Gila, in Yuma county, A. T., and is especially adapted for early fruit raising.

ASSEMBLYMAN CURTIS has introduced a bill in the legislature making it unlawful for any person to set up as an architect who has not served a five-year apprenticeship with a registered architect, and all architects now doing business must within 90 days register with the Controller of State, who shall charge a fee of \$10 for issuing such certificate. The bill was prepared by the San Francisco Chapter of the American Institute of Architects.

In a Los Angeles case the Supreme Court has decided that a laborer or a materialman cannot assign his mere right to assert and claim a mechanic's lien by complying with statutory provisions and clothe the assignee with the power to create the lien for himself. The Supreme Court says the legislature may not have thought that it would have been advantageous to a laborer to allow him to fritter away his wages at a ruinous discount to money-lenders.

THE recently formed irrigation district known as the Riverside Heights district, which comprises a quantity of land east of Riverside, has just begun the work of water development. The land in the district has been bonded for \$30 an acre to prosecute the work. The district will run a tunnel into the Box Springs range of mountains lying adjacent and east of the district lands, from which a supply of water will be drawn. The prospect for an abundant supply is good.

THE McClellan Ore Concentrator Company is establishing works at 126 Main street, this city, for the purpose of manufacturing the McClellan Concentrator. The claims for this machine are, that it is simple in construction and operation, very durable and a close saver of concentrates, besides being built at less cost and requiring less power than other machines for the purpose. Messrs. McClellan & Son are experienced miners and millmen, and no doubt more will be heard from this concentrator.

THE San Francisco and San Mateo railway will shortly commence work on its park extension from Eighteenth and Guerrero streets up the former westerly across Corbett road to Ashbury street, and thence by Frederick and Waller streets to Stanyan street, one block south of the Haight-street entrance. The single track now laid on Eighteenth street is to be replaced by a double track, and a short feeder is also to be built at the same time from Ashbury street and Clarendon avenue on the latter to Stanyan street, with the terminus facing "Sutro's farm," lying adjacent to the Clarendon Heights district.

A PRIVATE letter received from St. Paul, Kodiak Island, Alaska, by the schooner Undaunted, states that it was the salthouse and outbuildings of the Russian-American Packing Company's cannery, at Afognak, that were destroyed by the terrific rainstorm of November 24th and not the main buildings, as previously reported. The superintendent of the cannery, Edward Jones, who was killed by the collapse of the salthouse, was a native of Wales, 40 years of age and single. George Fogel, president of the can-

nery company, said yesterday that the main cannery buildings were well above high-water and strongly built. Their value was between \$20,000 and \$25,000. From what he had been able to learn the damages to the outside cannery structures would not exceed \$5000.

At a meeting of the Trades and Labor Council a committee on the grouping of trades reported that they had classified them as follows: Building trades—carpenters and joiners, painters and decorators, gilders, rattan-workers, pattern-makers and upholsterers; leather trades—Shoemakers' League, harnessmakers, finishers and tanners and curriers; iron trades—ironmolders, horseshoers; American order of Engineers; printing trades—printers and typographical unions; liquor and luxury trades—brewery workmen, barbers, coopers, cigarmakers and cigartuckers; food trades—bakers, bakers and confectioners, and cooks and waiters; water front—sailors and derrick men.

At the Stanford University, Palo Alto, a new brick power-house, 100x75 feet, has been finished, but the machinery will not be transferred to it until the summer vacation. It is designed to contain one 250 horse-power engine and one 125 horsepower and three dynamos. The present power-house will be used only as a boiler-house. The new foundry is built of brick and is 200x40 feet. The floor is made of firmly-packed clay. Twenty-four anvils and twelve forges are being set in place, and space is provided for more when needed. A portion of the building will be occupied by lathes and other machines for iron and steel. Another portion is reserved for use as a general repair shop for the mechanics employed by the university.

MARE ISLAND NAVY YARD mechanics are to build two new boilers for the revenue cutter Corwin. The four new boilers for the Monadnock have been recently tested under the supervision of Chief Engineer Burnap and Foreman Campbell. They stood the test admirably, and will be taken down to the monitor in a short time and placed in position. They are twelve feet two inches in diameter and are made of steel fifteen-sixty-fourths of an inch thick. They are built to carry 160 pounds of steam to the square inch, and the test subjected them to a pressure of 250 pounds. Foreman Campbell and all the boiler-makers under him admit them to be the finest set of boilers ever turned out. The Corwin's boilers will undoubtedly come up to the same degree of excellence.

THERE were in port Tuesday and on the disengaged list 57 vessels, aggregating 105,200 registered tons, as against 78,700 tons on the corresponding date last year. This list included 12 American, 42 British, 2 German and 1 Norwegian. There was not even one American vessel on the wheat-engaged list, all being under the British flag except 1 Italian and 2 German vessels. Iron vessels invariably receive the preference, as shown by the fact of there not being a single wooden one on the engaged list. All of the American vessels on the disengaged list were wooden. The Cape Horn route has provided employment for a good amount of American tonnage, and the merchandise traffic by the same appears to be well sustained. There were three ships on the list for New York, the Charming, Servia and S. P. Hitchcock. The amount of tonnage of all classes headed for this port yesterday from all sources was 263,800 tons, against 233,800 on the same date a year ago.

THE Senate Committee on State Prisons is considering a bill to make an appropriation for establishing a cordage factory at Folsom. Captain Aull's testimony showed that if the proposed cordage plant was put in at Folsom and the product sold at a small margin above cost, a number of free laborers would be thrown out of employment. There are at present 112 white persons engaged in the Tubbs factory. Since early in December no Chinese had been employed. Prior to that period, however, many had been employed. The work formerly performed by them was now being done by girls. Secretary Kellogg, of the Tubbs Cordage Co., said it was not a part of any combine, and that for the past five years about six per cent had been realized on an investment of \$1,000,000. The annual output had averaged 6,000,000 pounds. The capacity of the plant was 12,000,000, and the consumption of this coast 10,000,000 pounds. There was considerable competition from the East. If a factory were established by the State and run by convict labor, the company would have to suspend. Mr. Kellogg admitted that Chinese labor had been employed, but that the Chinese house on the grounds had been torn down and white girls, earning from \$1.25 to \$1.40 a day, were now doing the work formerly performed by the Chinese. In future none but white operators would be employed.

THE following is the copy of a letter received by the Westinghouse Electric Co.'s agent in this city from Mr. G. H. Winslow, superintendent of construction of the San Antonio Light and Power Co.: "Regarding the transmission you will be interested to know that the whole outfit of converters was connected up in Pomona and 10,000 volts delivered to it for a short time without a flaw in anything. As a result the San Antonio Light and Power Co. the next day ordered 19 more converters, so as to be able to also operate San Bernardino at that pressure. Then we used about 8000 volts for about a month on Pomona, the S. B. line not being ready; then we reduced this to about 5000 volts, which allowed us to take half the Pomona converters to San Bernardino and operate that line also at 5000 volts. We now have about 600 lights in Pomona and 200 in San Bernardino, 200 more contracted for New converters will soon all be here, when we will run at 10,000 volts on both lines. The San Antonio people are very much pleased at the success of the plant. Much of the time at the start we ran with hand-governing of water-wheels, but now we have an excellent governor on both generator and exciter, lately designed by the Pelton people. The original plans and specifications for this plant were drawn by Mr. A. W. Decker, E. E., the consulting and supervising engineer of Sierra Madre, Los Angeles county. The line distance to San Bernardino is 30 miles; to Pomona 16 miles. This is the longest-distance transmission in the world."

A Proposed State Debris Commission.

The following is the full text of Senator Ford's bill introduced Jan. 20th, to provide for the appointment, duties and compensation of the Debris Commissioner, and to make an appropriation to be expended under his directions in the discharge of his duties as such commissioner:

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Governor of the State of California shall, on or before the first day of January, eighteen hundred and ninety-four, appoint a competent civil engineer, for a period of four years only, to be known as and called the Debris Commissioner.

SEC. 2. Said Commissioner shall, during the time he shall be actually employed in the discharge of his official duties, receive a compensation of three hundred dollars per month, and his necessary traveling expenses, to be allowed by the State Board of Examiners.

SEC. 3. Whenever any Board of Engineers of the United States Government shall have been appointed with power to adopt plans and specifications for the construction of works for the impounding of mining debris, it shall be the duty of said Debris Commissioner to consult and advise with such Board of Engineers of the United States Government, and to examine and pass upon the merits of such works, and said Debris Commissioner shall determine whether or not such works are calculated to and sufficient to protect the navigable waters of the State, and to keep a record of such determinations.

SEC. 4. There is hereby appropriated out of the general fund of the treasury of this State not otherwise appropriated, the sum of two hundred and fifty thousand dollars, no warrant against said sum to be drawn or paid until the United States Government shall have appropriated at least an equal amount, to be used in the construction of works for the restraining and impounding of mining debris in California. Said money to be paid only upon orders only drawn by the Controller, upon the written request of the said Debris Commissioner, and to be drawn for the payment of not more than one-half of the cost of the construction of any such works for restraining and impounding mining debris as shall have been approved by him and duly adopted and recommended by engineers of the United States Government appointed for that purpose.

SEC. 5. The term of office of said Debris Commissioner shall be four years from the date of his appointment. He shall take the same oath of office as is provided by law for other State officers, and before he enters upon the discharge of his duties shall give bond, with sufficient sureties to be approved by the Governor of the State, in the sum of fifty thousand dollars, for the faithful discharge of his duties as such officer.

SEC. 6. The said Debris Commissioner shall have the power to appoint a secretary, at a monthly salary to be fixed by said Commissioner, not exceeding one hundred and twenty-five dollars per month. Said secretary to hold office at the pleasure of the Commissioner. And the State Controller is hereby authorized to draw his warrant monthly in favor of said secretary upon the order of said Debris Commissioner. Provided, however, that no secretary shall be appointed until said Debris Commissioner shall enter upon the actual discharge of his duties.

Mining with Artesian Well Water.

Frederick H. Edwards of Kimbola, West Australia has come from England, where he has been arranging with some capitalists of London for the formation of a large water-scheme to enable the gold deposits in the interior of West Australia to be worked with advantage.

Interviewed by a reporter Mr. Edwards explained how he intended to transform the barren desert into a scene of bustling activity.

"I have known for many years of some rich gold country which it was impossible to work on account of there being no water within 100 miles. Having studied the formation of Australia, I came to the conclusion that there must be water beneath the surface, if it could only be reached. The whole country is shaped on the surface something like a basin, the interior being far below the sea level. Therefore it is obvious to me that the heavy rains and floods of the winter season, which flow from the high coast ranges, must settle somewhere, and the interior is the place that it goes to.

"After several abortive experiments I succeeded in putting in a bore, with the result that a fair flow of brackish water was obtained. Now, with sufficient machinery I am confident that by reaching a greater depth I can get an endless supply of fresh water, and a few of these artesian wells sunk there would work wonders.

"I obtained a grant of all the land I want from the Government and went to England looking for capital, which, on account of the depression in Australia, I was unable to find there. As soon as I get back I shall start work, and hope to have half a dozen artesian wells spouting on the property within six months. Then you will see one of the finest gold fields in Australia opened up, that will probably exceed those which created such rushes some years ago at Ballarat and Bendigo."

THE North American Navigation Company has secured the entire \$100,000 required by the Paoama Railroad Company. It has sent back the contract between the two companies and with it a schedule of freight rates that will have to be ratified by the railroad company. Some minor changes were made in the contract, but they affected only the details and not the main features. It is expected that the steamers for the new company will be ready for service by February 15th. Five steamers will be required in the company's business and already three have been picked out and the company is making arrangements to charter them.

A Suggestion About the Cyanide Process.

REDDING, SHASTA CO., CAL., Jan. 28, 1893.

TO THE EDITOR: I notice in your issue of the 21st a letter from A. B. Paul, who, with his colleague, Mr. Garlick, owns the MacArthur-Forest process for Shasta county.

Everybody around here knows that Mr. Paul has been experimenting on this process for several months past, and everybody knows that he has spent a great deal more money than he has been able to extract out of the ore he has been treating. Now the works are shut down at present and presumably all the gold has been leached out of the tanks so that it would be a very easy matter for Mr. Paul to inform us who wish to adopt this method what are his total results; say how many tons of ore he has treated; what was the assay value of the pulp; what is the total bullion recovered; and what have been the total working costs at the mill.

In Mr. Paul's letter he laments the loss of his assayer for the sake of the "dear people," but if Mr. Garlick was consulted he could tell how much money the process had cost him, and if you add to that what it has cost Mr. Paul the "dear people" would learn something which would enlighten them more about this process than all the letters which have yet been published on the subject. It is possible that Mr. Paul has been experimenting with ore which does not contain sufficient gold to pay, but Mr. Paul has been experimenting with this same ore for years and all the time he felt sure he was losing enormous quantities of gold in the tailings; and all he has been praying for during all these years was a process to extract a fair percentage out of the ore. Now when he has got the process, alas! he discovers that the gold is not in the ore.

I agree with Mr. Paul very heartily when he says that there never was any new system put before the public with so little instruction for a successful outcome, and the wonder is that under such circumstances the process has made the advancement it has. I will ask Mr. Paul to tell us what advancement it has made in Shasta county. Nor do I believe it will ever make any advancement until the owners of the process will undertake to do what was done in South Africa—viz., to erect works at their own expense to responsible parties who will pay for the same when the process has been worked successfully for a reasonable length of time. If we have to pay for patent rights and royalties on a process which cannot be guaranteed to do what is claimed for it I am afraid very few will be induced to go to the expense of erecting the necessary plant and take all the risks of experimenting afterwards.

Now I would suggest to Mr. Paul that he get a list of those mines in Shasta county which by the ordinary process would lose over \$5 per ton in the tailings and make the mineowners an offer to erect a plant and work the same for say six months or until it has paid for itself, then hand over the plant with patent rights and royalties included for a sum equal to what it has cost to build the plant.

Supposing the plant cost \$5000, Mr. Paul's company to recover \$5000 net from the tailings, then hand over the plant for \$5000 cash. If Mr. Paul would do that then the "dear people" would understand that there was some intrinsic merit in the process, as they did in south Africa. Now it is all bosh to say there is a difficulty in getting rock with gold in it, because to my knowledge there are a dozen mines in Shasta county which if the ore was milled and amalgamated in the ordinary way there would be a loss of at least \$7 per ton in the tailings.

Mr. Paul knows these facts as well as I do, and yet he has spent 12 months experimenting with a low-grade rock that will not average \$3 per ton in the pulp at a great loss to himself and colleagues at a cost which if it had been spent as above mentioned he might have had five or six plants at work on \$12 ore within a radius of ten miles of Redding.

It is my opinion, for when we consider the failure Mr. Paul has made in making both ends meet, from whatever the cause may be, the uncertainty attending this process on different ores, and the want of a guarantee given by the patentees who wish to collect royalties on the number of tanks whether the process be successful or not, that the miners of California are wise in not risking their money on such an incomplete process where sulphuretted ores have to be treated; and by waiting a little longer the cyanide process will be so perfected that capitalists will join in building plants and take their profit out of the tailings.

A SHASTA MINER.

Iron From Sand.

The iron sands of New Zealand have once again been brought under public notice, this time by the medium of a former Sheffield metallurgist, Dr. W. T. Spencer, who is now residing at Napier, in our southern Pacific colony. This gentleman has, we understand, says *Iron*, patented a process for treating the ferri-ferous arenaceous deposits by electricity, by which, it is claimed, steel of the finest quality is produced. The iron sand found at Taranaki, New Zealand, and in other countries is, with the exception that it contains another metal, titanium, of the same composition as the magnetic iron ore which is met with in large quantities in Scandinavia, China, Siberia and a few other localities; and like the last-named mineral, it is attracted by the magnet. Alexander Watt says that the sand furnishes excellent steel. The theory of the formation of these iron sands was propounded by the late J. Arthur Phillips. Many crystalline rocks, he reported, contain magnetic and titaniferous iron ore interspersed in small grains and crystals. Such rocks, when disintegrated, give rise to the black sands which are abundantly found in alluvial gold-diggings and elsewhere. Along the littoral of countries in which crystalline and eruptive rocks abound, streaks of black sand washed out by the action of the waves, are frequently met with in sufficient quantity to admit of their being employed as an ore of iron. Among these localities may be

mentioned, in addition to Taranaki, the shores of the Bay of Naples, and many points of the northeast coast of British America, the most important deposits being situated along the north shore of the St. Lawrence, east of the Moisie river. At Moisie, where these sands form a large portion of the beach, after the prevalence of certain winds, belts of nearly pure black sands, which have been concentrated by the action of the waves, are found along the shore. The purer and thicker layers are separated by shovels from the more siliceous portions, and are afterwards further concentrated by washing. When thus freed from the minerals with which they are associated, these black sands consist of nearly equal portions of magnetic and titaniferous iron. Similar iron sands occur at several points along the coast of Labrador, where they are associated with quartz, garnets and feldspar. Mr. Phillips did not find that these iron sands had been successfully employed for the production of cast iron, owing to their finely-divided state; they are only adapted for the direct manufacture of wrought iron and steel.—Boston Journal of Commerce.

Mining Bell Signals.

The following is the full text of the "Mine Bell Signals" act presented by Senator Voorheis before the Senate and which passed that body Jan. 18th, being the first bill to pass the Senate:

SECTION 1. Every person, company, corporation, or individual, operating any mine within the State of California—gold, silver, copper, lead, coal, or any other metal or substance where it is necessary to use signals by means of bell or otherwise, for shafts, inclines, drifts, crosscuts, tunnels and underground workings—shall, after the passage of this bill, adopt, use and put in force the following system or code of mine bell signals, as follows:

- 1 bell, to hoist. (See Rule 2.)
- 1 bell, to stop if in motion.
- 2 bells, to lower. (See Rule 2.)
- 3 bells, man to be hoisted; run slow. (See Rule 2.)
- 4 bells, start pump, if not running, or stop pump if running.
- 1—3 bells, start or stop air compressor.
- 5 bells, send down tools. (See Rule 4.)
- 6 bells, send down timbers. (See Rule 4.)
- 7 bells, accident; move bucket or cage by verbal orders only.
- 1—4 bells, foreman wanted.
- 2—1—1 bells, done hoisting until called.
- 2—1—2 bells, done hoisting for the day.
- 2—2—2 bells, change buckets from ore to water, or vice versa.
- 3—2—1 bells, ready to shoot in shaft. (See Rule 3.)

Engineer's signal, that he is ready to hoist, is to raise the bucket or cage two feet and lower it again. (See Rule 3.) Levels shall be designated and inserted in notice herein-after mentioned. (See Rule 5.)

SECTION 2. For the purpose of enforcing and properly understanding the above code of signals, the following rules are hereby established:

RULE 1. In giving signals make strokes on bell at regular intervals. The bar (—) must take the same time as for one stroke of the bell, and no more. If timber, tools, the foreman, bucket, or cage, are wanted to stop at any level in the mine, signal, by a number of strokes on the bell, the number of the level first before giving the signal for timber, tools, etc. Time between signals to be double bars (—). Examples: 6—5, would mean stop at sixth level with tools. 4—1—1—1—1, would mean stop at fourth level, man on hoist. 2—1—4, would mean stop at second level with foreman.

RULE 2. No person must get off or on the bucket or cage while the same is in motion. When men are to be hoisted, give the signal for men. Men must then get on the bucket or cage, then give the signal to hoist. Bellcord must be in reach of man on bucket or cage at stations.

RULE 3. After signal "Ready to shoot in shaft," engineer must give his signal when he is ready to hoist. Miners must then give the signal of "Men to be hoisted," then "spit fuse," get into the bucket, and give the signal to hoist.

RULE 4. All timbers, tools, etc., "longer than the depth of the bucket," to be hoisted or lowered, must be securely lashed at the upper end of the cable. Miners must know they will ride up or down the shaft without catching on rocks or timbers and be thrown out.

RULE 5. The foreman will see that one printed sheet of these signals and rules for each level and for the engine-room are attached to a board not less than 12 inches wide by 36 inches long, and securely fasten the board up where signals can be easily read at the places above stated.

RULE 6. The above signals and rules must be obeyed. Any violation will be sufficient grounds for discharging the party or parties so doing. No person, company, corporation or individuals operating any mine within the State of California, shall be responsible for accidents that may happen to men disobeying the above rules and signals. Said notice and rules shall be signed by the person or superintendent having charge of the mine, who shall designate the name of the corporation or the owner of the mine.

SECTION 3. Any person or company failing to carry out any of the provisions of this act shall be responsible for all damages arising to or incurred by any person working in said mine during the time of such failure.

SECTION 4. This act shall take effect immediately.

A SHINGLE trust, similar to that recently formed in Oregon and Washington, will shortly be organized at Vancouver, B. C. The trust will include all mills in the Province. For some time the shingle trade has been unsatisfactory, low prices prevailing. The actual cost of production is \$1.40 per thousand, yet the sale of 2,000,000 was reported recently at \$1.15. The chief object of the formation of the trust is to regulate prices. Most of the shingle men are in accord with the movement.

Mining for Bismuth.

W. B. Roberts, M. E., contributes to the Australian *Mining Standard* an article on bismuth mining in Australia, from which we take the following:

The Degilbo division of the bismuth district of Queensland is rather remarkable for its varied geological conditions and the diversity and peculiar character of its ores, bismuth being found in the forms of telluride, sulphide, carbonate and also small quantities of "native" metal. In most cases there is a varying quantity of gold found with these ores, and in a few cases they are associated with copper, when they carry a small amount of silver.

The principal country rocks are a crystalline metamorphic slate (in places traversed by dykes of porphyry) and a coarse micaceous granite.

The first notable find of bismuth was made some six years ago in the property now held by the Mt. Shamrock Gold Company, Limited, of London. An outcrop of gossan, evidently the decomposed capping of an extinct thermal spring, was found to be rich in gold, and associated with it was a heavy yellowish mineral that on being submitted to the local analyst was pronounced by him to be carbonate of bismuth.

The circle of the old geyser was fairly well defined, the diameter being about 40 feet, with a slight underlay south-east, and this has since been followed down to a depth of 225 feet, and the ore therefrom milled yielding about 15 dwts per ton. Before the "pipe" formation was understood considerable money was expended by other companies in trying to find the combination of what they supposed to be a lode, but without success.

No regular vein of bismuth was found, but boulders of rich ore were met with occasionally and put aside, and a five ton shipment sent to London realized £160 per ton, the ore yielding in addition some 30 ounces of gold per ton.

With depth, however, the ore became difficult to treat, the gold being to a great extent chemically combined with the bismuth and telluride—in fact, a telluride of gold and bismuth—but at the same time there was too much arsenical and iron pyrites present to permit of a payable bismuth concentrate being made, the smelters in Europe declining to purchase ore that does not carry at least 10 per cent. The mill-tailings in Globo assayed from one-half to one per cent bismuth.

Whenever a clean lump of the telluride could be got it ran extremely high for both gold and bismuth. The average of quite a number of assays done by me gave about 40 per cent bismuth and 200 ounces gold per ton, and one lump of same, 10 pounds in weight, assayed 66 per cent bismuth and 2170 ounces gold per ton.

Finding that they were only getting a small proportion of their gold by amalgamation process, the company erected concentrators, and a chlorination plant, of the Newberry-Vautin type, but all attempts in the latter direction failed, owing, it is said, to the peculiar character of the ore, and they have since been realizing on the concentrates by selling them to smelters.

Some four miles distant from Mt. Shamrock, a belt of quartz reefs in granite country are being worked, the remarkable feature of them being the large quantities of sulphide of molybdenum that they carry, lumps as large as hens' eggs showing out very clearly in the white quartz, and in some cases the gold being interleaved between the flakes of molybdenite.

About 12 miles east of the Mt. Shamrock Company's property a local company, known as the Biggenden Mining Company, is operating very successfully for gold. The mine, situated about 100 yards from the contact line of the slate and granite, is primarily a huge deposit of magnetite, but as iron ores are as yet valueless in Queensland, this would not have attracted any notice had it not been for the bismuth ore found sparingly interspersed through it.

The bismuth not occurring to the extent of more than one per cent, and the sp. gr. of the two being very close, considerable trouble arose over the concentration of it, but this was overcome by the erection of a magnetic separator of the Ball-Norton type. Bismuth being diamagnetic, the material was found to be eminently suitable for magnetic concentration, the iron, in the absence of a market, being thrown over the dump.

A later development proved the existence of a large body of hornblende running parallel with and separated from the magnetite deposit by a slate fault of some 30 feet in width, and this hornblende was found to contain both gold and bismuth in payable quantities. This rock runs about one-half ounce gold per ton, and one to two per cent bismuth. From this the company pays regular monthly dividends. The body of pay ore is, so far as yet proved, about 20 feet wide by about 130 feet long, another slate fault forming the hanging wall, and underlies about 60 inches.

The mode of operating is as follows: The ore body is tapped by a tunnel, from which the cars are run out, and sent to the mill, 130 feet below, by a gravity tramway. The ore is then dumped over grizzlies, the coarse lumps going to the rock breakers, of which there are three (Dodges). From the bins it gravitates into automatic feeders (Challenge), and from them into the Huntington mills—two three and one-half foot, and one five foot being worked, and from them over copper plates, and thence to the Frue vaners, a mixed concentrate of magnetite and bismuth, running 10 to 12 per cent of the latter, being obtained. It is then dried, and run through the magnetic separator, either one or two passes being given to it, according to the quantity of iron present, the aim being to get it up to about 20 per cent bismuth. It is then put up in coarse bags, carrying 100 pounds each, and shipped, ore of this percentage netting in London about £100 per ton.

Unfortunately the market for bismuth is very limited, and the handling of the ore and metal being controlled by a "ring," only a proportionate share of ore sales per month is allowed to each of the few producing mines of the world.

Under other conditions this mine could very comfort-

ably undertake the supplying of the total demand, and if ever a question of "survival of the fittest" should arise, she will be found "right there."

The ores of bismuth are as follows: The principal ore is the sulphide (bismuthinite), 82 per cent Bi, Sp Gr 7, also carbonate (bismutite) percentage about the same. It is also found in pockets as bismuth ochre, Bi₂O₃, Sp Gr 5.5, also in combination with tellurium, as telluride, and also as native metal, in occasional nuggets, the largest of those I have seen being 12 pounds. The sulphide of Bi is very similar in appearance to stibnite, crystallizing in long, needle-like aggregations, the carbonate also very much resembling the oxide of antimony, being a dense, heavy, greyish-white mineral, with a very strong tendency to take up the strain of carbonate of copper, should there be any of the latter ore in the vicinity.

The metallic bismuth is a silvery-white metal with a peculiar pinkish shade, Sp Gr about 9, with a magnificent rhombohedral crystalline structure.

Exposed in a molten state to the air it oxidizes rapidly; in fact, it can on a pinch, be very well substituted for lead in assaying operations, the only drawback being that it is apt to leave the gold or silver scattered over the cupel in minute beads.

Its chief use is for making the various fusible alloys. Its own melting point is 507 degrees, but alloyed with certain proportions of lead and tin, it lowers its and their melting points in a remarkable manner. The assayer who forgets this fact and uses litharge in doing a gold or silver assay of an ore containing bismuth will probably be surprised, as I was, by finding the button melt in the tongs before it could reach the cupel, in a moderately hot muffle. Another curious property of the metal is its expansion of one thirty-second of its bulk as it cools, and this is availed of for alloying with type metal for giving clear-cut edges, and also in taking sharply-cut casts of engravings, etc. The expansion is so pronounced that on pouring, say, one ounce of the metal into a mold that will not allow it to expand laterally, as it cools it will crack, say half an inch of slag, and a tiny pin-point of metal will shoot up and continue to come till there is a head on top of the slag the size of a small marble.

A small quantity is also used in medicine as subnitrate, prepared by precipitating it with excess of water only from a nitric solution. A little is also used as a cosmetic under the name of pearl white.

Hartley's Meadow Lake Process.

John Clark of, Nevada City, writes to the *Transcript* as follows:

I wish to reply, through your columns, to some assertions made in a recent number of the *Coffax Sentinel* regarding the Meadow Lake mining district. The *Sentinel* copies an article from the *Placer Republican*, in which the statement is made that the late H. H. Hartley, who died so suddenly at Meadow Lake last fall, had a process for working the ore of that district successfully, but that he kept it a secret, and that with his death the process was lost. The *Sentinel* says:

"It is true that Mr. Hartley, like most any miner in that section, could save some of the gold by working the ore on a small scale, but as to his ever having a process by which the ore could be successfully worked on a large scale, we know pretty well that Mr. Hartley never did have or know of one."

"Messrs. Frank Cook and John Clark, of Sierra City, have several mines in the Meadow Lake district. For four years past they have been trying to find a way by which the rock could be successfully milled, but thus far they have met with the same difficulty that those who tried it before them met with. Of course they can pound the rock up in a mortar by hand, the same as Mr. Hartley did, and get enough gold to provide themselves with the necessities of life, but that is all they or any one else can do in the Meadow Lake district."

"Messrs. Cook and Clark, as well as the late Mr. Hartley, and many others, have set out from there to almost every mill in the world where refractory ore is supposed to be worked successfully, but the reports from every one of these places have always been the same, which was to the effect that the gold could not be saved."

Now I desire to say that Mr. Hartley promised to fix matters so that Mr. Cook and myself could have his process in case anything happened to him. In compliance with this promise, he informed Mr. E. A. Hearsey, the storekeeper at Cisco, of what the process consisted, and instructed him to give it to us should his death occur. He also wrote out the process and deposited it in Booth & Co.'s safe at Sacramento. That he had a way of working the ore successfully I am positive of my own knowledge, and the same was the result of long years of experimenting, success crowning his efforts when he was financially unable to carry on operations on a large scale, and after capitalists and moneyed mining men had lost faith in the district on account of the many failures made to work the ore. He had become a hermit almost, and, hermit-like, kept the secret to himself. But that he could reduce the sulphurets obtained from the quartz, and extract the gold, I am certain, and at a cost not to exceed \$6 or \$7 per ton of concentrates.

As to finding a way by which the rock can be successfully milled, we have solved that question by the little prospect mill we put up last summer. By crushing the ore and passing the pulp over the canvas the free gold is saved, and by then running the pulp on to concentrators the sulphurets can be separated and caught. By concentrating say 15 tons of this pulp into one ton, almost any process, even if expensive, could be employed to extract the gold profitably. Pounding the rock up in hand-mortars is too slow work for me, unless there is plenty of free gold in it, which is not the case with the most of the Meadow Lake quartz, as nearly everybody knows it is very refractory ore.

We took 1200 pounds of quartz to San Francisco to be tested on a Cornish jig. Prof. Martin also worked 200

pounds in his globe dry-ore concentrator. The results showed that if the works were at the mines, both processes would handle the ore successfully, leaving a small margin. What is wanted is suitable works near by, economical handling of the quartz, crushing it with stamps and then concentrating, after which we will treat the sulphurets by the Hartley process.

I am satisfied that the gold can be extracted in this way, and at a profit, and intend to stay with the district, notwithstanding the adverse opinions of those who think there is nothing in it.

The Coast Supply of Timber.

Statistics just completed show that the State of Washington contains 410,333,335,000 feet of standing timber—more than enough, in fact, to form a belt around the world over three miles wide. This is the first time experts have estimated the timber values of the Pacific Northwest.

During the past six months the *Puget Sound Lumberman* has been collecting authentic timber statistics, with the following results, which are taken from the proof sheets of the *Lumberman*, and show the number of feet of standing timber in the United States:

	Stumpage Value.	Number Feet Standing.
Washington.....	\$269,561,329	410,333,335,000
Oregon.....	86,685,709	236,893,255,000
Nine Southern States.....		280,000,000,000
Wisconsin.....		26,560,035,520
Michigan.....		24,140,699,199
Minnesota.....		12,749,526,000
Pennsylvania.....		7,500,000,000
Maine.....		1,500,000,000
New York.....		1,000,000,000
California.....	\$100,700,000	100,700,000,000
Montana.....	48,750,000	65,000,000,000
Idaho.....	22,500,000	30,000,000,000

Unauthentic estimates are, for Alaska, 66,960,000,000 feet, and British Columbia something over 1,000,000,000,000 feet. Of the 190,000,000 acres in British Columbia, 170,000,000 are put down by the Canadian Pacific Railway as timber and grazing lands. Computing half of this area as either grazing or inaccessible land, and lumping the balance off at the very low average of 15,000 feet to the acre, the unauthentic estimate of 1,275,000,000,000 is reached.

County surveyors, millmen and, lastly, cruisers—timber cruisers—men who go through the timber and estimate the number of standing feet of timber—have been the sources of authentic statistics in Washington and Oregon. In other States Government statistics are accepted.

The value of the "stumpage," or timber as it stands in the forest, is reckoned at current prices per 1000 feet, which are in Washington 65 cents; Oregon, 44 cents. In Minnesota the stumpage value is \$2.87 per 1000 feet, \$3.69 in Wisconsin, \$1.61 in the southern States and \$3.44 in Michigan.

All estimates given are based on minimum figures. There are 23,588,512 acres of timber land in Washington. In height, fir trees average from 200 to 400, and 100 to the first limb in many instances. In Tillamook county, Oregon, there are fir trees from 15 to 30 feet in diameter. Cedar trees that are from 12 to 20 feet in diameter and from 150 to 350 feet high, with the first limb 90 or 100 feet from the ground, are called "large" and "fine."

At present rates of consumption the Pacific coast could supply the world for 70 years. Washington's supply would be exhausted by the world in half that time.

Specifications for Road Contracts.

The appended specifications relative to road work by contract under the new law have been adopted by the Santa Barbara Board of County Supervisors, and may serve as a model for other counties where conditions are the same. Fault is found with the new law in that it does not allow bids to be advertised, opened or awarded, except at regular meetings. It is designed in Santa Barbara to make a separate contract per year for each public road. The specifications are as follows:

In the matter of letting contracts for maintaining and keeping in repair the several public roads in Santa Barbara county.

The Board of Supervisors of the county of Santa Barbara, State of California, adopt the following specifications to wit:

1. To establish a grade with sufficient round to carry off all surface water and allow none to stand thereon.
2. Keep ruts filled in, the same to be filled as soon as any portion of the road is in need thereof, and as soon as the same is dry enough to scrape and fill as aforesaid, and at all times as aforesaid to keep the roadway smooth.
3. To fill chuck holes with clay-heavy soil, or gravel only, the same to be determined and approved by the road commissioners of said supervisor district.
4. With the exception of the bridges spanning the Santa Ynez river and those in Gavioia Pass, to keep all bridges and culverts in good repair and renew them when destroyed through neglect or carelessness of the contractor; the material therefor to be furnished by the county, to be delivered in Santa Barbara, Lompoc, Los Alamos, Los Olivos, Santa Maria and Carpinteria. To keep them clear from obstructions and in good repair, and destroy or cause to be destroyed, in the months of July and August of each year, all thistles, Mexican cockleburrs, or cockleburrs of any kind, and all noxious weeds growing on any portion of the public highways or public roads in their respective districts. To cause banks to be graded, bridges and causeways to be made where necessary, keep the same in good repair, and renew them when destroyed.
5. To keep the ditches on each side of the road open and free from obstructions, and of sufficient depth and grade to carry and drain the said roads of water.
6. To keep the culverts open and also the natural and established channels for carrying off the water in low places; where culverts are necessary the contractor to put in culverts and to grade up the road that water will not stand thereon, the material therefor to be furnished by the county, delivered at the several places above named.

It was decided to call for bids per year for keeping said roads in repair for one year, two years, three years and four years, the board reserving the right to let the contract for one, two, three or four years, and to reject any and all bids; said bids to be opened by this board April 4, 1893, said notice to contain the descriptions of roads furnished by the respective supervisors for the roads in their several districts.

The San Juan Placer Region.

Cass Hite, one of the best-known prospectors and mining men of Utah and Colorado, has given the *Denver Republican* an interesting description of the San Juan country. According to his account it is not a poor man's El Dorado. He says:

Bluff City, Utah, is about 110 miles from the mouth of the San Juan river, and lies near the lower end of the fertile valleys of that stream. Ten miles below, the river enters what is called the "Fifteen-Mile canyon." At this point it cuts, at the depth of 3000 feet, through a reef of upturned sedimentary formation, known as the "Comb." Running at the base of this reef is the "Comb Wash," which heads in the Blue mountains 25 miles north of its mouth, where it empties into the San Juan river. William Hyde ran a trading post there ten years ago, trading with the Navajos. The place is called Rincon. That is as far as a road can ever be taken down the river, and is about 90 to 100 miles to where it empties into the Colorado river. From that point the San Juan enters and plunges through three canyons that are dark and appalling as the mighty canyons on the great Colorado.

FIFTEEN-MILE CANYON.

Fifteen-Mile canyon cuts through sandstone, shale and lime, and is in places heavily charged with iron and copper; in fact, so far as the whole country is concerned, it can be called ferruginous. This canyon terminates at the mouth of Gypsum creek, and from there for five or six miles the country is lower.

Then the river drops down into Forty-five-Mile canyon. It cuts through an uplift or high ridge, which on the north side of the river is called the Cedar ridge; on the south side it is called the Monumental ridge. This ridge or uplift lies alongside of Monumental valley. They both derive their name from lofty monuments which stand over that country to the number of perhaps a hundred, and which would put all natural objects in the Garden of the Gods to shame. Where the San Juan cuts through this formation, which is old red and calcareous sandstone, shales, marl and lime, for 3000 feet in length it is simply grand. Nothing I have seen in the Great Glen or Grand canyons of the Colorado river can surpass it for beauty or weirdness.

This canyon I never had a chance to prospect as I would like to have done. It cannot be approached except by boat. There are a few places where man can climb down those mighty walls. In the Forty-five-Mile canyon are very strong symptoms of coal oil. In places the oil, where it exudes through crevices and mixes with the water in the river, can be scented for a half-mile.

LARGE MESA FORMATION.

There is a large mesa formation, running north and south from the Elk mountains to the Sierra Calabasa, beyond the head of Moonlight canyon. After the San Juan leaves the Forty-five-Mile it goes for six or seven miles through a country where the surface is much lower. Coming from the south through this depression or valley is Moonlight canyon, which we named in the fall of '81, reaching it by moonlight after a weary day's toil and exploration, starved for water and the Navajos lying to us all the time as to where we would find water. The Clay Wash comes from the north and flows into the San Juan nearly opposite Moonlight canyon.

I see by the papers that they are claiming coarse gold in those places. I look upon that as an impossibility. The Elk mesa upon the north and the Mesa Calabasa on the south are entirely sedimentary formation, and all the gold that has ever yet been found in the sedimentary rock is fine gold. Coarse gold does not travel far from the leads.

That whole country has lost several thousand feet of its surface. The great process of erosion has worn the gravels, bedrock and all down, down to the sea. Gold, being soft and heavy, has naturally ground very fine as it travels.

The only show, according to my own belief, for coarse gold in that region would be in the short gulches on the north or west of the Navajo mountain, which is at the junction of the San Juan and Colorado. They head in the trachytic formation of that island mountain, and unless

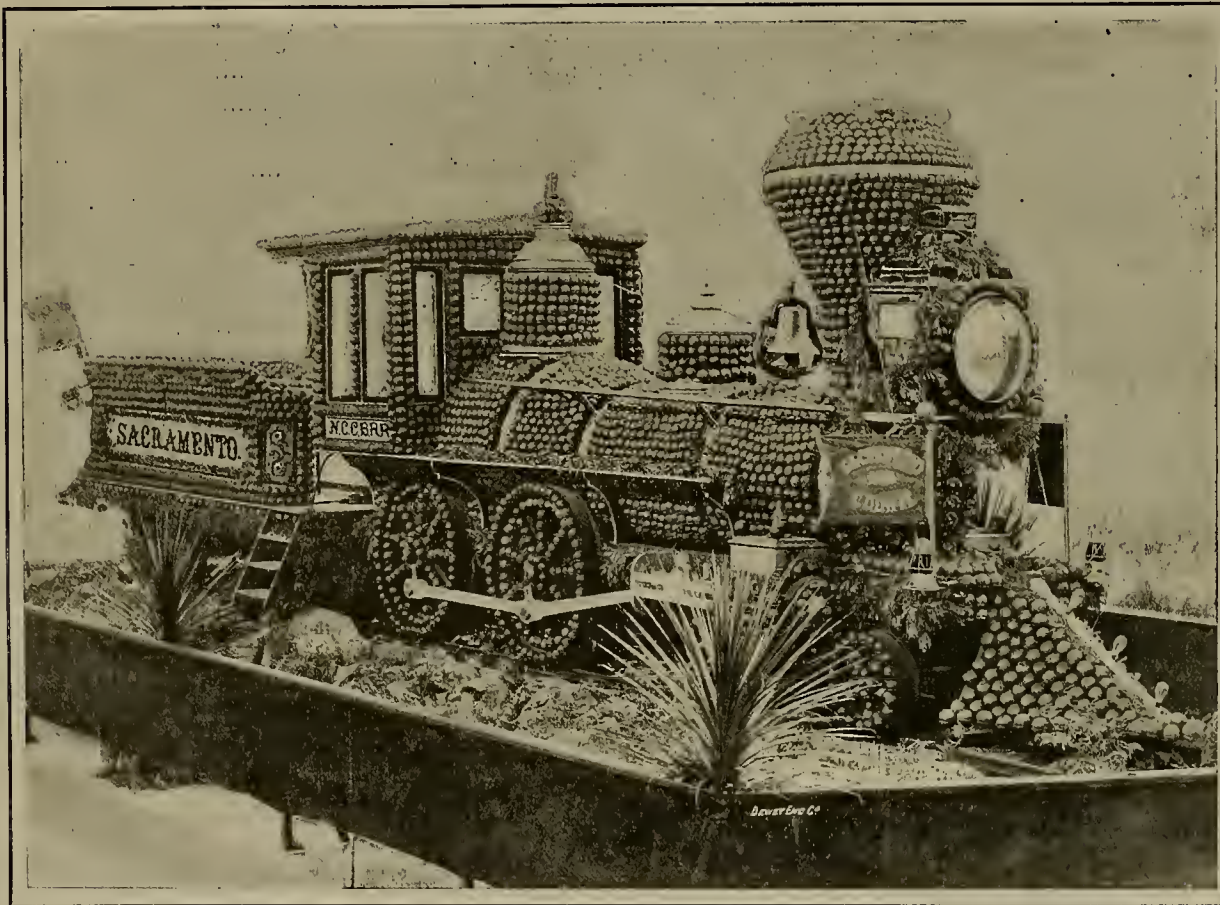
they have found coarse gold in shale, marl and sandstone, then there is no show for nuggets outside of those few, little, short gulches heading up into the Navajo mountain. You ask me my opinion, and, although I may be wrong, I do not think there is any coarse gold in that country.

MUCH FINE GOLD.

But for fine gold, large areas evenly distributed, as fine gold generally is, that has a great future. That entire country is sedimentary rocks. Erosion has caused that great box-canyon country, and left them between them high mesa formations which show in the most distinct manner the great strata of time.

The stupendous belts of the sedimentary often cut 2000 and 3000 feet in depth. A stratum of quartz pebbles, many feet in thickness, constitutes one of those great blankets that cover that entire country, and with that stratum I contended for two years. I never found anything that a poor man could work, although I am convinced I know of much good gold property in that section that could be worked with good profit with capital enough to put it in working order. The gravel in that quartz stratum, the water level of the strata for miles, would suggest that it was formed by glaciers.

I had many assays made from that, and got from \$3 and \$4 to \$25 and \$30 per ton. Now, in the canyon below that immense stratum, and even upon the tops of lower mesas and basins, where the quartz stratum has deposited its dis-



PART OF SACRAMENTO COUNTY'S EXHIBIT AT THE NORTHERN CITRUS FAIR, SAN FRANCISCO.

integrated washings, I found gold every time, but it was *oro fino*.

The great canyons of the lower San Juan and the Colorado have performed the functions of mighty sluice-boxes. The fine gold and the richest of the black sands, owing to their gravity, have dragged along behind all other matter and deposited wherever they had a chance in large and small bodies, and in some instances very rich. From the mouth of Moonlight canyon it is about 35 miles to the confluence of the San Juan and Colorado. That is a very rough canyon, and with but few gravel deposits. Coming into the San Juan from the south are Moonlight canyon, Copper canyon, Foote's and East canyon, the latter being the last, and it drains everything to the east of the Navajo mountain.

GOOD GOLD COUNTRY.

That is a good gold country, and the fact that I did not strike it rich in there is no reason in the world why others may not. I drifted over on the Colorado and struck Dandy Crossing, Tickaboo and Good Hope, where I could and did live for years with a "rocker." I believe that the bed of those streams is yellow, but it is the easiest bars or deposits we are always after. The gold deposits on these streams will last for a century of active mining. It is a barren desert country, and the great mass of poor adventurers who go there will likely suffer great disappointments, as well as for "chuck."

The waters of the San Juan and Colorado rivers are hard to take out for mining and irrigation purposes, owing to the walls and banks and the rise and fall of the water in the river. Dandy Crossing is on an air-line from mouth of Moonlight and Clay Wash, about 40 miles, and by road 65, and Bluff 70 miles and by road 90 to 100. From Utah and all of Colorado north of Pueblo and Grand Junction the best road is from Green river, Utah, by Dandy Crossing, being from Green to the crossing 125 miles, and from the crossing to mouth of Moonlight by White canyon 65 miles.

The Sacramento Exhibit.

We present herewith the *piece de resistance* of the Sacramento county exhibit at the Northern Citrus Fair now in progress in the Mechanics' Pavilion in this city. The exhibit is certainly a striking one, and one of the most popular in the pavilion.

Unquestionably, there is something very proper in Sacramento modeling the chief feature of her display as she does. Historically, the choice is significant, for Sacramento men projected the first overland road, and was the basis of operations and supplies for the most difficult construction on the line. Even though the main offices of the railway are in San Francisco, Sacramento has always retained most important features of the work. Another point of fitness in the symbolism of the locomotive lies of course in the eminence of Sacramento in the great eastern fruit-shipping trade, for, though there are many terminals nowadays, Sacramento is the point of dispatch for the upper two-thirds of the State, and not seldom the products from the far south pass through her portals.

The whole range of field, garden, orchard, vineyard and household products is fully represented, and each in almost endless variety. Such an exhibit is merely an exponent of the diversity and extent of the resources of the

county, and no one was surprised that the highest awards at the fair should be commanded by such merit.

AN important decision was handed down on Thursday last by the Supreme Court at Phoenix, A. T., in the case of the Watervale Mining Co. of Chicago, owners of the Black Eagle mine, versus the owners of the Big Comet. The case originated two years ago. The owners of the Big Comet followed a vein which transversely crossed the vein of the Black Eagle, and the latter corporation began suit in ejectment.

The lower court decided in favor of the defendants, basing the finding on four decisions of the Supreme Court of Colorado and one by Judge Hallett, United States District Judge of that State, who construed section 2322, Revised Statutes, to apply to the crossing of veins on strike.

The case was appealed, the appellants relying on the doctrine that the section defines instead that owners' claims to mineral beneath the surface must be confined to the boundaries of the claim extended downward vertically, except in case of a lode whose apex runs parallel to the adjoining claim and drifts outside above the described vertical boundaries. The appellants pointed to the fact that section 2322, which applies to transverse veins, is directly opposed to the theory of the Colorado courts, and the Supreme Court took a similar view of the case and reversed the judgment of the lower court.

The decision is regarded among legal and mining men as of the highest importance, overturning the construction of mining law which prevailed since 1879, the date of the Colorado decisions.

The Weather for February.

The local weather bureau gives the following data relative to the months of February for 21 years:

The highest temperature during any February was 76° on the 22d, 1888.

The lowest temperature during any February was 33° on the 5th, 1887.

Average date on which last "killing" frost occurred (in spring), March 8th.

Average precipitation for the month, 3.71 inches.

Average number of days with .01 of an inch or more, 10.

The greatest monthly precipitation was 12.52 inches in 1878.

The least monthly precipitation was 0.24 inches in 1886.

The greatest amount of precipitation recorded in any 24 consecutive hours was 3.60 inches on the 4th and 5th, 1887.

The greatest amount of snowfall recorded in 24 consecutive hours (record extending to winter of 1884-5 only) was 3.7 inches on Feb. 5, 1887.

The highest velocity of the wind during any February was southwest 48 miles on the 22d, 1891.

Mechanical Progress.

Large Steam Boilers.

In power boilers there just now seems to be a leaning not only to higher pressures, says *Iron Age*—a tendency that has existed and exerted an increasing influence since the introduction of double, triple and quadruple expansion engines—but also toward the increase of horsepower capacity in a single boiler. It must be admitted that large boilers of any type usually generate steam more economically than small boilers of the same type. It was formerly believed that above a certain limit of capacity there was no sensible increase in economy of steam production corresponding to increase of boiler power, and it is doubtful still whether, with pressures still in vogue, after a capacity of from 60 to 100 horsepower has been reached, any notable difference would be observed between the amount of steam generated per pound of coal and the quantity made by a pound of the same fuel in a boiler of the same kind, having a capacity of say 150 horsepower. We should usually call a boiler of in horsepower small, and one from 60 to 80 horsepower large. The difference of economy between the smaller and the larger of these boilers would generally be very sensible, and it is easy to account for it. While the outer shell, from which considerable heat escapes, even when protected by good insulation, increases directly as the diameter, the holding capacity increases as the cube of the diameter, provided all the dimensions are proportionally increased. The heating surface that can be placed within this outer shell, whether in the form of tubes or flues, does not increase as the cube of the diameter. Still it may be made very much larger in the aggregate, in proportion to the outer surface, than in a smaller boiler.

But this is not all. When the pressures carried were much lower than are demanded by modern steam engine practice the surface losses were much less than is now the case; so that differences in economy are now apparent that formerly would have been too small to be considered important. Thus we now hear of orders for single boilers of 500 horsepower capacity to be used for stationary engine purposes. Such a boiler would be as large in proportion to a 60 horsepower boiler as an 80 horsepower boiler is to a 10 horsepower. There should be, therefore, a very notable economy in the use of such larger boilers with the high pressures now used.

The danger of explosion and the enormous destruction that might result from the bursting of a boiler of the large capacity now coming into vogue is pushing the sectional water-tube and safety types of boilers rapidly to the front. Such boilers can be made to withstand enormous pressure without danger of blowing up, and they can have any desired capacity within reasonable limits. That their first cost is rather more than boilers of other types has retarded their introduction, but with the high surface temperatures of modern practice their merits have become more pronounced, and the question of first cost will no longer be so controlling as it has been in the past.

Steamship Shafts.

In discussing the recent accident to the Umbria the *American Machinist* says: The main shaft of the Umbria as we have it in our mind, was 24 inches in diameter. Now it seems an enormous pressure of steam must be required to twist such a shaft as this off. It looks immense to us who spend our time on shore, but it is well known to steamship engineers that they will be twisted off. In fact, it is considered from the time of construction up that it is only a question of time when they will fail. First, the shaft must be kept within moderate limits as to diameter, in order to reduce the friction to as low a limit as is practicable. This means that such a shaft is generally made smaller than the strictest mechanical constructions would call for. It is probably proper that it should be so made. Then again, if we take the conditions under which such a ship is worked, we shall find further reasons for its failure. It is impossible that such a shaft shall be kept strictly in line. Now if we take a piece of iron—it matters not to what use it may be put—and continually bend that piece, it is only a question of time when we shall break it. This is the condition under which the main shaft of a modern steamship constantly works. As we have said before, it is never in line. It is constantly being bent this way and that way, and as surely as can be will finally fail. There is no help for this, so far as we can see. We must take the conditions as we

find them, and must meet them in the best way possible to meet them, and that is exactly what is done in the construction of the modern steamship.

Let us recapitulate. We must not make the shaft too large, or we induce undue friction, which prevents speed. We cannot put the shaft actually in line, and finally it will break, whatever its size might be. But modern science and the exercise of modern skill have done so much for us that all we expect in the event of a failure of the shaft of a steamship is some delay. We know as nearly as we can know anything, we shall keep top of the waves, and come to shore a little later, perhaps, but come there safely and properly.

It might be said that the shafts of steamships should be made so large that they would not break, but then we sacrifice speed—we put power to useless purpose, and on the whole it is wise, perhaps, to take the risk which will come of a breakdown of of this sort, rather than sacrifice the convenience and comfort secured by the speed which we get in modern steamship transportation.

It ought to be stated that the engineer corps of the Umbria experienced no serious difficulty in putting the vessel in shape to complete her voyage.

Gas vs. Coal for Cooking.

As showing the rivalry that exists in catering to and for the domestic fuel trade of the country, we append the following from the address of Captain William Henry White, president of the American Gas Light Association, at its annual meeting in Boston:

"But having granted that electricity was a great spur to our sides, and that its advance taught our patrons the need to them of a more profuse illumination than that which formerly answered their purposes, in my opinion the main cause of the advance shown in our gas output is to be traced to the pertinacity with which the introduction of gas for purposes other than lighting has been followed. I certainly am not wide of the mark in saying that many, even of our fairly large companies, are to-day, or have been during the summer season, sending out more gas for purposes other than illuminating than was sent out by them 15 years ago for every purpose. What is the inevitable knowledge that it brings to us? What is it that this so plainly shows us the future shall be? (1.) That our field is to be many times larger than any that we ever dreamed could be our portion—that is really bounded only by the limits of the habitable portion of the various communities to which we cater. (2.) That we are growing closer every day to the 'poor man' as our ally. During the past two seasons, more particularly in the last, the use of gas for cooking purposes has increased phenomenally. Thousands of cooking appliances have been placed, and, in fact, in the city of New York, it is rather the rule than the exception now that architects, arranging for the construction of large apartment houses, prepare their plans for the placing of gas cooking ranges instead of coal ranges. New and ingenious schemes or plans for encouraging the domestic use of gas have been thought out and applied. Lectures by experts in the 'art culinary' have been given, with much attention to detail; repeatedly, even in our smaller cities, prizes have been put up for competition among the matrons and maids of several towns, and now comes Cincinnati, where our ex-president, General Hickenlooper, proposes to award \$500 in money prizes, for competition by the female pupils in two prominent high-schools of that city.

"Ten years ago such schemes would have been regarded with, to say the least, marked disfavor; to-day they are accepted by us as legitimate and praiseworthy aids to the spread of our industry. This matter of increasing the day send-out will call for primarily but one important expenditure on plant account—the augmenting of holder capacity, and that expenditure will repay us doublefold, in that it will insure such capacity for all needed purposes, either by day or at night, enabling us to work more economically over the entire time in our generating plants."

FAST TORPEDO BOATS.—The famous torpedo-boat builder at Elbing, Schichau, has just attained an unprecedented speed even for this class of vessel, torpedo boats built by him for the Russian and Italian governments having reached 27½ knots on an hour's run at sea. The new British boats are to be 200 tons displacement, while the Russian boats are 130 tons, so that the former may do better by reason of greater power and greater size. The length of Schichau's boat is 152 feet 6 inches, the beam 17 feet 5 inches. She may carry 40

tons of coal in her bunkers. On trial, however, she had only 20 tons on board. The small guns carried weigh only 2½ tons; the torpedo armament, 6 tons; the crew, provisions, stores and firearms, 4½ tons; drinking water, 2½ tons; engine and boatswain's stores and reserve parts, 4½ tons—so that all the movable parts come to 20 tons, making, with coal, 40 tons. The vessel and the machinery are, therefore, very light. The shell plates are barely a quarter of an inch thick. There are two locomotive boilers, protected by the coal bunkers, supplying steam at 195 pounds pressure to high speed engines. The guaranteed speed was to be 26½ knots in the open sea, while on trial the vessel actually made 27½, or to be more precise, 27.4 knots, as a mean of one hour's steaming at sea. Schichau promises even higher results with the torpedo boats he is now completing.—*The Steamship.*

Scientific Progress.

The Medical Use of Compressed Gases.

Dr. Clement B. Lowe, in a note on this subject to the Philadelphia College of Pharmacy, remarked that within a comparatively recent period there has been introduced to the notice of the medical profession the use of compressed gases, the principal ones now being used in this way being oxygen and nitrogen-monoxide, formerly known as nitrous oxide, or laughing gas.

The medicinal properties of both of these gases have been known for many years. Experiments made upon animals have shown that the inhalation of oxygen produces no injurious effects, but the reverse; they gain in body weight through the stimulating effects upon the nutritive functions, these results being produced mainly by the effects of oxygen upon the blood through the increase and stimulation of the red corpuscles. The effects thus produced upon animals have been verified by numerous cases reported by physicians of prominence. The chief diseases in which it is indicated are diseases of the respiratory organs, characterized by difficulty in breathing, such as asthma, croup, etc.; also in the early stages of phthisis pulmonalis, in chronic indigestion, and especially is asphyxia from poisonous gases, such as carbon-monoxide, etc. In the latter case its use may be invaluable; for instance, a person has been found insensible from the inhalation of carbon-monoxide produced by imperfect combustion in a stove in a bed chamber. If the carbon-monoxide has not been present in sufficient amount to saturate all the hæmoglobin of the red corpuscles of the blood, recovery takes place, but very slowly, it being weeks or months before the patient is restored to normal health. In such a case the inhalation of oxygen would be of the greatest value, the hæmoglobin being at once changed into oxyhæmoglobin and the blood in the arteries being restored to its bright scarlet color.

The anæsthetic properties of oxygen-monoxide were discovered by Sir Humphry Davy. It was first used in dentistry by Dr. Wells, of Hartford, Conn., and more recently as a remedial agent by some of the most eminent physicians of the country, Dr. J. E. Blake and A. McLane Hamilton being prominent among them. It is also being extensively used by medical quacks under the name of compound oxygen. It should be stated that in many cases the latter gas has given better results than those from oxygen. It is stated that one of the best known of New York physicians has used more than 20,000 gallons of nitrogen-monoxide in his practice during the past two years, chiefly in the treatment of nervous diseases. He regards it as a sheet anchor in nervous prostration, insomnia, melancholia, etc.

While, as above stated, the use of these gases therapeutically is not new, the use of them in a compressed form is more recent, as, previous to the use of the apparatus devised by the S. S. White Dental Manufacturing Company, of this city, which, through their courtesy, I shall have the pleasure of showing you this afternoon, oxygen had to be made by the physician himself, necessitating the use of expensive apparatus and the loss of valuable time. Even if procured from those who manufacture it for calcium lighting (with but one exception in this city), it would taste of illuminating gas (carbureted hydrogen), on account of the same pump being used to compress both gases.

As the use of these compressed gases shall become more frequent by the medical profession, pharmacists can add to their stock these cylinders, and be ready to supply them at a moment's notice as they would any other remedy, as is already done by a member of our college.

In using the apparatus the compressed gas is first conducted into a rubber bag or a

metallic gas-receiver, from the former of which it is inhaled under ordinary pressure, the gas passing through a bottle partly filled with water. If to be used as an enema, the gas is displaced from the receiver by water flowing from a can placed about 22 inches above the receiver, and is passed through a bottle, containing warm water, to the patient.

Nitrogen-monoxide is used in the same way for inhalation, but when used as an anæsthetic, of course, the face piece as used by dentists should be employed.

Natural Selection at Fault.

J. W. Slater writes to *Science* as follows:

We are generally told by orthodox Darwinians that both the structure and the actions of animals are to a great extent dependent upon natural selection. Any organ, or any habit which is not advantageous to its species, will be, it is said, promptly suppressed as a possible danger, or at least an unremunerative demand.

Yet there are a few cases of habits which seem to have been acquired or maintained in flat contradiction to this doctrine. Every one knows that the *Felidae*, from the Bengal tiger down to our domestic mouser, when they have seized a prey do not at once kill and devour it, but either torment it or at least sit and watch it for some time before administering the fatal bite or blow. The consequence is that the victim sometimes escapes, as we all have witnessed, when pussy is playing with a mouse. One instance at least is on record where a man, struck down by a tiger, quietly drew a dagger and stabbed the assailant to the heart. This could not have been done with a beast of prey of the canine or ursine family, as they do not allow time for devising and executing such a maneuver. Hence we see that the peculiar conduct of the cats is disadvantageous to themselves, and we ask why it has not been abandoned. Certainly any cat which should at once devour any mouse or bird which it had caught would, in times of scarcity, have a decided advantage over its fellow-cats.

Similarly injudicious is the conduct of the domestic hen. As soon as she has laid an egg she at once announces the fact to all whom it may concern by her well-known cackling. What benefit is this outcry to herself or to her species? On the contrary, the outcry is heard by animals which are given to stealing eggs, and is understood by monkeys, if we may accept the evidence of La Vaillant. There again, therefore, we have a line of conduct quite contrary to what natural selection would determine.

In man there is not, indeed, a habit, but an organ which has lost its uses, yet is still developed in every child brought into the world. The outer ear was formerly provided with muscles by which it could be turned toward any sound for its better recognition. These muscles have become obsolete by hereditary disuse, so that in all normal subjects the ear is motionless. That it could formerly be directed so as the better to receive a sound will be less denied as it survives in certain exceptional individuals; but as it is absent in the great bulk of our species, the question arises, Why does the external ear not gradually cease to be developed? No one can now contend that it is useful.

THE PREPARATION OF CHROME.—At a recent meeting of the Académie des Sciences, Mons. Moissan announced that Mons. Placet had succeeded in preparing considerable quantities of chrome by electrolysis in such a manner that the industrial employment of that metal has now been rendered possible. The chrome contains 99 per cent of metal. It is, therefore, purer than that which is obtained by reduction with carbon, which gives a metal containing a heavy proportion of carburet. The industrial application of chrome is worthy and capable, Mons. Moissan says, of great extension owing to the inalterability which it communicates to the surfaces on which it is deposited. In this respect it is superior to nickel; while the alloys which it can form with the usual metals are very remarkable.

SINCE the late cholera epidemic at Havre and Rouen, the Prefect of Seine-Inférieure has been investigating electrical methods of disinfection. *Figaro*, in a recent number, has drawn the attention of the French nation very forcibly to this scheme, and it may be well if other nations devoted a little attention to the project. The process of M. Hermite, of treating sea water electrically, is the method alluded to, and M. Gautier, the writer of the article, is urgent in his suggestions that the commissions of Havre and Toulon and other ports open to infection should adopt some such means of dealing with the sanitary state of those towns.

Electricity.

Lighting Factories by Electricity.

In considering the problem of lighting a manufacturing establishment by electricity, says the *Electrical Review*, it is often found that the engine already installed to furnish power to the operating machinery has a surplus, which it may be desired to use for driving the electric-light dynamos. On general principles, however, it is always the better plan to have a separate engine or engines for this work. Sometimes, it is true, the factory owner having such power surplus in his main engine does not wish to incur the expense of a new additional engine, or there may be difficulties in the way of securing room for an extra engine. Under such circumstances, of course, there remains nothing else to be done but to take the necessary power from the engine already in use, and the difficulties of operation then to be encountered are found in the fact that the often unavoidable speed variations in the engine, due to heavier or lighter loads, according to the amount of work being done in the factory, will unfavorably affect the light. Besides this, the light will, of course, be cut off as soon as the factory engine stops, and illumination of the shops will be impossible after the regular working hours unless it is proposed to run the large engine for the lights alone, a proceeding which may be rather expensive.

These difficulties, it has been pointed out, may be avoided by the addition of an electric storage-battery plant which will serve as an electric reservoir, reducing current variations and storing up electric energy at times of surplus, to be given out again at other times when the demand for light may be at its maximum. A comparatively small surplus engine-power may, in this way, sometimes prove sufficient to do a considerable amount of electric-lighting and save the cost of enlarging the engine plant.

A sample installation of this kind was described some time ago in one of the foreign electrical journals, *Der Elektrotechniker*, and a few of the particulars there given may be of interest. In this case the shops and offices of a factory and some annexed dwelling-rooms were to be lighted, and it was desired to have light available in the offices and dwelling-rooms for some time after the factory engine was usually shut down. The shops, accordingly, were furnished with 100-volt lamps, and the other quarters with 70-volt lamps. The dynamo furnished, normally, a 110-volt current, so that, with an electromotive force of 2½ volts for each storage-battery element, the dynamo had a charging capacity of 44 elements. A 44-cell battery was, therefore, coupled up with the dynamo, a circuit-breaker being interposed in the circuit to prevent discharge of the battery through the dynamo in case the speed of the latter, for any reason, should fall off. Three mains were led off from the battery. The first wire was connected with the positive pole of the second cell and served both the 100-volt and the 70-volt circuits. The second wire was connected with the negative pole of the 43d cell and supplied current for the 100 lamps. The third wire, finally, was connected with the negative pole of the 31st cell and supplied current to the 70-volt lamps. With this arrangement there were, as will be seen, two groups, one of 42 cells and one of 30 cells. The first group furnished a current of $42 \times 2.5 = 105$ volts, and the second a current of $30 \times 2.5 = 75$ volts. The first and last cells were not included in the supply circuits. The arrangement admitted of three combinations: 1. With the lamps out of circuit, the storage battery is charged during the day. 2. Both the 100-volt and the 70-volt lamps are supplied with current by the dynamo and the storage battery together. 3. The 70-volt lamps are fed by the storage battery alone.

It is to be borne in mind that in an arrangement of this kind, the storage battery's capacity must be sufficient for the number of lamps to be supplied, and must also be designed to receive the whole of the dynamo current as charging current.

SLIPPERY TRACKS.—Some way of effectually preventing slipping of streetcar wheels on the track when the brake is applied is yet to be devised. The cold weather and snowy rails are responsible for many of the collisions and casualties which occur during the winter season. In Scranton, Pa., recently there was a sort of epidemic of collisions for a few days, chargeable entirely to this cause. The motormen claim that the custom of sprinkling salt on the rails to melt the snow and ice thereon is a good one to that extent, but a bad one in that, when the salt becomes crushed and pulverized, it makes the rails as

slippery as before. There seems to be some philosophy in this argument, and it would be well for street-railway managers to think it over a bit. In the meantime can some one not discover a way to prevent the slipping of wheels and thus remove a factor of danger in the operation of street-cars, electric cars particularly, in the winter time?—*Electrical Age*.

Distribution of Electric Power.

The utility of electricity as a motive power is one of the industrial facts added to the history of the present century. The production of electricity was a known possibility since the ancient Grecian sage developed the electric spark by the friction of amber, but its practical utilization was delegated to the modern scientist. Its application to new and diversified forms of service is now a matter of daily occurrence, with its possible developments as yet unmeasured or defined. In the telephone, telegraph and other inventions we have seen a rapid and marked advance, which in itself is of so unique a character as to make its future more a tax on our imagination than an imposition on our credence or faith.

With this mysterious force yet but imperfectly understood and its service practically crude and immature, the much that has been done presupposes the more that is as yet undone. In the world of industry its future field is broadly outlined, where, as a motive power, it is as yet in but fractional application. If, in economics of service, unit of efficiency and in security of supply and manipulation, it establishes its supremacy over present methods, the electric motor will be as ubiquitous as the chimneys of our factories and the furnaces of our mills. This is a question of time and not of faith, and the forecast suggests the establishment of systems that will make the distribution of electric power a practical art or science.

Industrial competition is more than ever urgent for higher efficiency at lower costs, and as the struggle for trade continues the necessity will become increasingly stringent. In relaxing this strained condition, electricity will have its mollifying influence by bringing the basis of motive power values to democratic levels, where the potent force will be in general and cheap distribution. Projects of this kind have materialized in local and frictional experiments which have justified their gradual and intelligent extension. What has been done in this direction is but provisional and prefatory, it being a foregone conclusion that central stations for the generating of electric power for industrial purposes will be a special industry in the near future. In the redistribution and development of industries, it is impossible to forecast its results in the home as in the mill, and with the skilled but poor mechanic, as with the man of larger means, the service of this power will be in easy reach.

In a recent discussion of this matter at a meeting of the Manchester Association of Engineers, Mr. Thwaite of Liverpool said: "The whole technical and scientific world was indebted to the German Government for fixing and determining the long-distance efficiency factor of high-pressure transmission, as this would have more effect in supplying natural force for the well-being of man than any other of the creative human efforts of the last century. The Birmingham Corporation Electric Lighting Committee had already commenced to distribute power to the ratepayers for industrial purposes, and although it might be years hence ere the power-distributing system in its entirety would come into play, that it would come was as certain as that daylight followed night." In this field, as in others where electricity has already established its special value and efficiency, its service will find a widening employment. The question of its relative merits with other forms of motive power, while leaving a wide margin for differences of opinion, in no sense is skeptical as to a bright future for the distribution of electric power.—*Age of Steel*.

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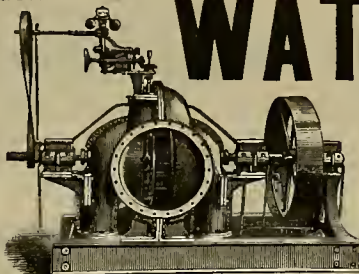


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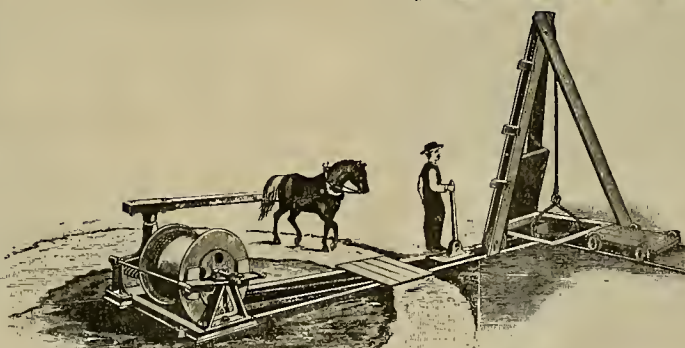
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Useful Information.

Abolishing London Fogs.

The London County Council has turned out to be a remarkably active and enterprising body, says the Boston *Herald*, but when it is said to be seriously proposing to take the problem of abolishing the fogs that have so long given ill-repute to that city, it would seem that it is taking a tremendous contract upon its hands, for a proposition to abolish the London fogs sounds very much like interfering with the order of nature, such as undertaking to stop snowstorms, or, like General Dvorenforth, attempting to shake rain out of the sky. But when it is considered that the horrible fogs of London are of comparatively modern date; that they did not exist two centuries ago, and that they are due to human agency, the undertaking, though still a tremendous one, does not seem unfeasible. The character of these fogs, which obscure everything with an almost inky blackness, and often make noon-day as dark as midnight, is due to clouds of unconsumed carbon poured out of thousands of chimneys into a humid, misty atmosphere, where the smoke mixes itself with the natural fog in such a way as to seem almost a solid.

The only thing required, therefore, to prevent the fogs is to provide a different method of combustion. This it is proposed to do by establishing municipal gas works, as has been done very generally in other English cities, and producing gas for fuel purposes on such a scale and consequently at so low a price as to induce its general adoption by providing the cheapest method of heating. Its use would be made compulsory if necessary to the end in view. The advantage of gas for fuel, however, would be so evident that recourse to compulsion would hardly be required. The economy of the innovation would be very great, for not only do thousands of tons of coal now pass off unconsumed in the form of smoke, but the loss caused by the suspension of traffic while the fog lasts—and they sometimes endure for days at a time—is enormous.

B. H. Thwaite makes a daring suggestion in the *Contemporary Review* in this connection. He would generate the gas in the coalfields of South Yorkshire, Staffordshire and South Wales, and transmit it in pipes to London under high pressure, as in the case of natural gas in this country. He estimated that by this means an enormous saving over the transportation of coal by rail would be effected, amounting to a total over \$20,000,000, which, after providing for interest on cost, maintenance, etc., would, while giving consumers the advantage of fuel at a price much less than that of coal, leave a very large surplus available for public improvements, including the establishment of the new system of public water supply that London so sadly needs.

A Chance for Inventors.

The Government of India is offering a number of valuable prizes for the best designs or models of a cart suitable for military requirements, to wit, a mule cart for the transport use of the British army in India. The prizes offered are five in number, and are respectively \$3750, \$2500, \$1875, \$1250, \$625, or \$10,000 in all. *Industries* says: The award will be intrusted to a jury consisting of three military and three technical experts. The question of cost being of the highest importance, the designs should give the estimated price in pounds sterling or rupees of a single cart delivered free on board in London or at Bombay, Calcutta, or Allahabad. As a guarantee of good faith on the part of the competitor as regards estimated cost, he will, if recommended for a premium, receive, in the first instance, only one-half of such premium immediately on its award. He will, however, only receive the same proportion of the other half as represents the proportion by which he may have underestimated the actual cost of the cart. It is left to the jury to ascertain by tender in the open market, or by such other means as it considers suitable, the cost of the cart to Government, and to make its award accordingly. The object desired to be attained by this competition is the production of a design, accompanied in all cases by a working model, for a military transport cart adapted to conditions which make the use of interchangeable metal parts for all important portions of the cart absolutely indispensable. The designs and models should reach the Secretary to the Government of India, Military Department, Calcutta, not later than June 30, 1893.

THE unexampled development of the advancement of electricity for street railroads is

well shown in the statistics compiled by the *Street Railway Journal*. During the year 1892 there was an increase in the mileage of electric roads of 1878 miles, a decline of 842 miles in the horse roads, a gain of 52 miles in cable roads, and a decline of 22 miles in steam dummies, thus showing how largely horse railroads have been converted into electric lines. At the close of last year there were in operation in the United States 11,665 miles of street railways, the motive-power being distributed as follows: 4460 miles horse; 5939 electric; 646 miles cable, and 620 miles steam. The number of cars in use has reached the large figure of 38,400, which is nearly 15,000 in excess of the number of passenger cars in steam railroad service. It is stated that the investment in electric roads during 1892 has been probably not far inferior to that in railroad extensions during the past year.

MANGANESE IN RUSSIA.—Manganese is found in several parts of Russia. The mineral is met with in the Government of Ekaterinoslav, but is little exploited. Manganese is also found in the Urals, in the Government of Perm, but is only worked by local capital. The Orsk mine, in the Government of Oranburg, is but in the first stage of development. The Charopan mines, in the Caucasus, are so productive that millions of poods from them are annually exported. Of 10,500,000 poods of manganese extracted in Russia in 1890, 800,000 poods only came from mines situated outside the Caucasus, which latter district exports almost the whole of its production to Great Britain. The Russian exports of manganese, which were almost nil some years ago, have largely developed of late. Between 1887 and 1890 they more than doubled, a circumstance partially explained by the blockade of ports in Chili, which temporarily suspended shipments of Chilean manganese to England. Efforts are being made to develop the mining center of Charopan. A branch line is about to be constructed connecting it with the Trans-Caucasian Railway, upon which branch transport would cost 10 copecks per pood, compared with 18 copecks, the charge for animal conveyance.

SUBSTITUTE FOR LEADED GLASS.—Some worker in glass has hit upon a novel yet expensive substitute for leaded glass. It is nothing more nor less than cut glass applied to window decoration. In one instance, a great broad sheet of polished plate has been divided into diamond pattern quarries by a series of "V" shaped grooves, cut deeply into the glass. While having all the effectiveness of lead lines, these cut figures sparkle and glow in the sunlight like so many crystal prisms, and produce beauties impossible in any ordinary leaded work.

ONE VIRTUE OF CINNAMON.—"No living germ of disease can resist the antiseptic power of essence of cinnamon for more than a few hours," is the conclusion announced by M. Chamberland as the result of prolonged research and experiment in M. Pasteur's laboratory. It is said to destroy microbes as effectively, if not as rapidly as corrosive sublimate. Even the scent of it is fatal to microbes, and M. Chamberland says a decoction of cinnamon should be taken freely by persons living in places affected by typhoid or cholera.

THE screw-propeller ferryboats have thoroughly shown their superiority since the rivers filled with ice, this being the first experience of the new boats on the Pennsylvania route across the Hudson river. While other boats are liable to have their wheels clogged and labor so hard that they are occasionally delayed to raise steam, the submerged propellers experience no difficulty whatever, and run nearly on schedule time. The large screw steamers on the sound have done equally well.

THE clouding of the inner surface of microscopic cover glasses has recently been investigated by Herr R. Weber, who finds, says *Anthony's Photographic Bulletin*, that only glasses of a certain composition are affected in this way. Those containing excessive amounts of alkali soon lose their luster in the presence of moisture, while those of a slightly greenish tint are the most stable. The moral is obvious.

ONE hundred and nine thousand locomotives are at present running on the earth. Europe has 63,000, America 40,000, Asia 3,300, Australia 2,000, and Africa 700. In Europe, Great Britain and Ireland take premier position with 17,000 engines.

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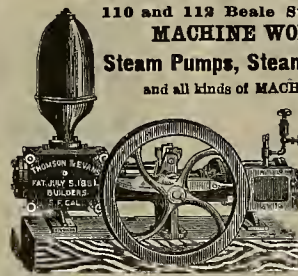
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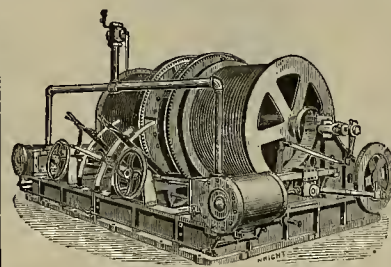
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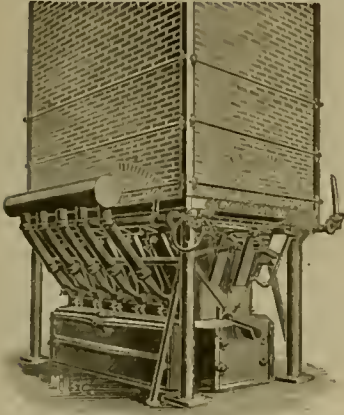
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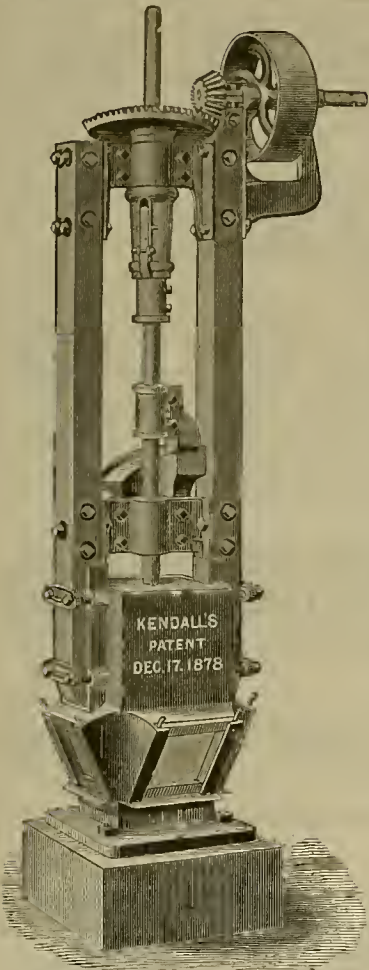
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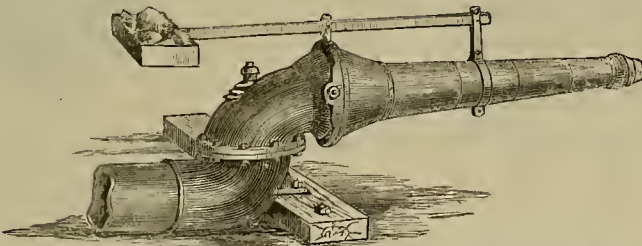
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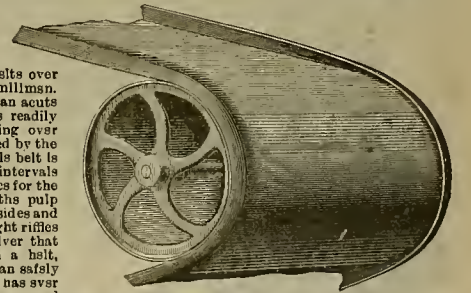
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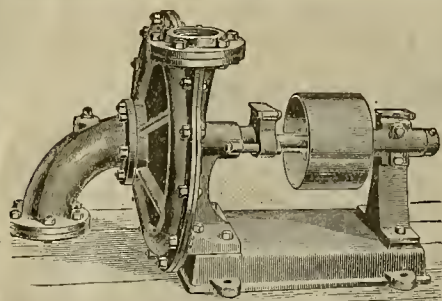
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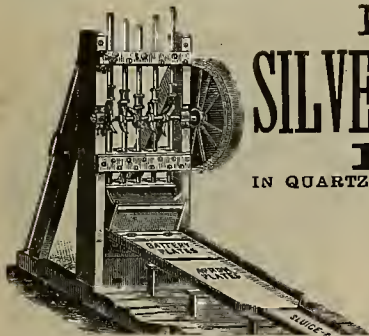
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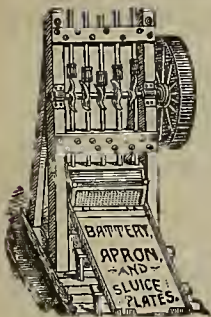
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Mining Summary.

The following is mostly culled from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

THE MOSER MINE.—*Calaveras Chronicle*, Jan. 28: Work on the Moser mine, situated about a mile and a half from this place, has been energetically prosecuted ever since it was bonded to the parties now in possession of it. W. T. Harris, the general superintendent and manager for this company, is well known by all the old residents of this vicinity. He has been at work about three months, and the results of his development so far more than justify the good opinion he at first entertained of the property. The developments up to the present date consist of a tunnel 325 feet in length at the south end of the mine and near the Old Lamphear. This tunnel cuts the ledge at a depth of 100 feet, showing a fine body of ore seven feet in thickness of solid quartz, besides a rich feeder six inches thick about five feet from the west wall. From tests made at various points across this ledge, and from the rock taken out, an average of \$10 per ton is a very safe estimate of the value of the rock. At the mouth of the tunnel, where the company proposes to locate its principal works, is an eight-stamp mill in process of erection. The work is in charge of that well-known and efficient mechanic, Geo. E. Woodbury of Railroad Flat, ably assisted by Mr. Wullom of Stockton. It is expected that the mill will be completed and in operation by the 1st of March. Two hundred feet north of the tunnel first described is another tunnel run through the west rim of the Moser gravel mine. In this tunnel three ledges were exposed—the first, a 15-inch ledge of high-grade ore, mostly ribbon rock of remarkable richness. Actual tests from this ledge show the rock as ranging from \$5 to \$186 per ton. This kind of rock has been shown to a depth of 50 feet. The second ledge, 25 feet from the first, is about three feet in width and shows rock of the same general character and appearance as the seven-foot ledge first described. Five hundred feet farther north the same ledges are exposed on the surface, with very gratifying prospects, and between them a large body of decomposed talcose slate containing bunches and small stringers of rich rock. This would indicate a pay chute of not less than 700 feet in length, dipping toward the north, thus insuring to the company all the dip, no matter to what depth it may reach. The company consists of the well-known wine merchants of Stockton, George West & Son, Frank E. Lane and W. T. Harris. Mr. S. S. Moser, of whom the property was bonded, retains a one-eighth interest.

El Dorado.

ORO FINO.—*El Dorado Republican*, Jan. 28: Sixteen men are employed at the Oro Fino mine on Big Canyon in the French Creek mining section. They are under the direction of Superintendent Pierce and the ownership is vested in San Francisco parties, a man named Lee being chiefly interested. The shaft is down 105 feet, and from the bottom a tunnel has been run to cut across the ledge, which is an immense body of quartz that is traced for miles—across the river into Amador county, it is said. They have run their tunnel into the ledge a distance of 45 feet without finding the wall, and unsuspended progress in that direction, being fearful that more water than they cared to handle would come in from the wall. The rock taken from the tunnel was milled profitably, and the owners seem to feel every encouragement to go ahead.

BIG SANDY.—The Big Sandy mine, near Kelsey has made some very favorable development work recently that will be encouraging to owners of similar property in that mining section, where many similar deposits exist. The mine at the surface consisted of a wide deposit of porphyry, as miners term it, a brownish-yellow matter traversed by many small gold-bearing quartz veins. At first the mine was operated by crushing the porphyry and quartz without separating and a large open cut was excavated. When the ore was thus taken out on top, it was determined to sink a shaft to see what results would be obtained when depth was reached. The shaft was commenced on one side of the vein. It has now reached a depth of 80 feet, and a crosscut reveals a ledge of nearly solid quartz bearing gold to paying quantities. The shaft will be pushed on down, and it is believed that the quartz veins will consolidate into a good solid ledge.

GREEN VALLEY.—C. T. Uhlenkamp and Geo. Weaver were up from Green Valley country last Monday. The latter has been working his mining claim again this winter, and found a nugget not long ago worth several hundred dollars. A number of pieces have been found nearly as large as a man's fist. The claim is in a wide ravine or flat and the soil very shallow. The gold usually contains quartz.

Humboldt.

HUMBOLET PETROLEUM.—*Watchman*, Jan. 23: Every turn in the work of developing petroleum in Humboldt but adds to the certainty of the deposit, confirms and makes confident the minds of those engaged in the enterprise. The latest expression upon the matter which we have is that of Prof. A. C. Hickman, who has recently made an investigation of the Garberville region. Mr. Hickman appears to be perfectly conversant with oil development in Pennsylvania, and claims that there can be no doubt of the existence of large deposits of crude petroleum of the highest character, and that its development in commercial quantities is by no means a problem—that is an accomplishment that is certain to come to pass. It now transpires that the former superintendent set

up the derrick several hundred yards south of the location selected by Mr. Clark, the expert who located the lands for the company. Prof. Hickman claims that, had the well been sunk where the location was selected by Mr. Clark, they would have struck the oil-bearing vein at the proper depth, but sinking as they did and striking it as they did at 410 feet, was too near the surface for successful service; that they should not have gone below that point in that well. He claims, however, that this well is by no means a lost venture, for it has demonstrated certain facts; it has exposed with a certainty the nature of the formation, and will be a valuable guide in locating the next well. Oil was struck in considerable quantity at 410 feet, but they thought to strike the second sand at 1800 or 2000 feet, and thus get a strong flow, but in this have failed, and are now shooting the well at the 410-foot point. Here they will undoubtedly secure at least an ample demonstration of petroleum, and with the history of this well as a guide feel certain of success in the location of a second well. The operation of shooting the well was delayed a few days this week for lack of proper materials. Meantime those most conversant with the work feel that whatever difficulty may be encountered, the ultimate result is bound to be development of petroleum.

Inyo.

PROMISING OUTLOOK.—*Register*, Jan. 28: Some rich specimens are being shown from the Georgia gold mine in Redding's canyon nearly east of town. A chunk of quartz from there now in Bulpitt's store is heavily speckled with the precious metal. Reports say that the ledge is increasing in richness as it is followed, and the owners are sanguine as to its value. Geo. F. Willis, who is working the mine, owns a half interest and holds a lease of the interests of Hill & Anderson.

PANAMINT.—*Cor. Inyo Index*, Jan. 28: The mountains bordering on the east side of Death valley, partly in Lincoln county, Nevada, southeastern Inyo and the northern portion of San Bernardino county, Cal., embracing a large territory and lying between longitude 115° and 117° west, and latitude 35° 46' and 36° 46' north, is a comparatively unknown country. Very few men have had the hardihood to brave the dangers, endure the trials and privations necessary to go through in order to prospect that section. Amargosa and Black mountains forming the eastern boundary of Death valley, have in many places never been visited by white men and possibly very little by the Indians living in the vicinity, as they have a limited knowledge of the water and topography of the country, seeming to avoid it for some reason. What little has been found out in regard to the mineral character by the few whites who have penetrated the mountains, is of a very flattering nature. Many specimens of rich gold, silver, copper and lead-bearing ores, and samples of borax, soda, lithographic stone, clays and other minerals have been found and brought in from both the mountains and valley. In consequence of the great heat of the deserts, which had to be crossed before an entrance could be made in the mountains, considerable risk attended the undertaking. In one of the canyons leading down from the Fernal range to Death valley, on the north side of the canyon, an iron-stained quartz ledge crops out for quite a distance. Some of the croppings show gold freely and are very rich. Never has there been any work performed upon the ledge and doubtless has never been seen by more than three white men, who discovered it while making their way across the mountains and valley on their way to Panamint some years ago. Stopping to investigate the extent of the discovery was out of the question, as they had no knowledge of the country and water nearly gone, contenting themselves with bringing a few samples. The pieces brought in were very rich. Before reaching water they nearly perished from thirst, and no inducement could be held out after their recovery to again cross the valley that summer. Many ledges of silver bearing quartz have been found by the float rock washed down toward the valley; some containing horn silver, others containing copper and base metals, and high grade in their character. Great boulders of lead lie exposed upon the surface, which being traced up lead to huge croppings of galena, discolored by the elements, looking like black and brown basaltic rock in the distance and when broken glisten and sparkle in the sun's rays like huge diamonds. In the past the discoverers have not been benefited by their find, as the lack of transportation and capital has prevented working and development. From assays, many were found to go from 5 to 100 ozs. in silver, a trace to over \$30 in gold and very high in lead, in some cases over 80 per cent, when galena was tested. What a source of supply it would be for the Los Angeles smelter, if the Salt Lake railroad was finished! Not only this, but other sections would contribute large supplies of ores, and upon which development has been made; many miners now having large quantities of lead ores upon their dumps that cannot be reduced for the simple reason that there is no suitable fuel for reduction, the bringing it in being too costly, and transportation of ores to where they can be worked costing from \$60 to \$80 per ton, which would eat up all profits, bringing the miner in debt. At Resting Springs, milling was attempted but soon abandoned, the ore carrying too high percentage of lead to admit of successful amalgamation. In the foothills bordering the valley, large veins resembling quartz crop out hold. To any one not acquainted with their composition, they would be taken for barren quartz ledges, but are very rich in boric acid. In the near future they will become the source of most of the supply of our commercial borax. Many varieties of fine building stone are found here, white and colored marble, red and brown freestone, slate

and other stone suitable for architectural and artistic purposes. In places where volcanic agency is discernible, red and brown-colored earthy matter has been formed which, upon investigation, might produce an excellent article of mineral paint. Clays as white as the driven snow, showing a beautiful polish on being cut, closely resembling meerschaum, and others suitable for manufacturing earthenware, and firebrick also exists here. Toward the east side of the valley, extending for several miles in length and some two miles in width, is an enormous body of nearly pure salt, looking like a great mass of ice. In places, crevices have been formed and huge pieces tilted on end, forming fantastic figures, it being of sufficient purity, after the surface has been removed, for domestic purposes. Along the course of the Amargosa river, in many places the depression is below sea level, as much as 120 feet being found at a point opposite Bennetts Holes. Large beds of extinct lakes, rich in borax, soda and other mineral salts, lie in the valley.

Lake.

THAT COAL MINE.—*Clear Lake Press*, Jan. 27: Considerable talk and some little excitement have been caused of late regarding the discovery of coal in this vicinity. We took occasion last Saturday, in company with another gentleman, to visit the supposed valuable deposit, which is located in the hills some five or six miles to the northwest of Lakeport. We found the spot where some work had been done, and also found coal indications, such as "black-jack," fire-clay and an occasional ball of sulphur. Still, the indications are not sufficient to warrant us in saying or believing that a vein of coal is imbedded near at hand. It is barely possible that a vein may be found, and yet a fortune may be expended to uncover but a small pocket. In a coal-mining region, such a prospect as has been disclosed in the locality mentioned would receive little or no consideration. We found a piece of "cap" rock which had evidently been in close proximity to coal, but whether in large or small quantity we have no means of ascertaining. The fire-clay found was similar to that usually found underlying coal beds, but of that quality known to old miners as "bastard" clay. We are well satisfied that there are many who will be loth to take out report of this reputed coal discovery as we give it, so thoroughly are they imbued with the belief and hope that such a bonanza has been found. We regret, indeed, that we cannot give a more favorable report, but this we could not do and confine ourselves strictly to truth in the premises, be the disappointment what it may. We have had much experience in the coal mines of the East, and are probably better qualified to speak on such a subject than a person who is but a novice in such matters. We would not counsel any one to spend either time or money in prospecting for coal at the point mentioned, unless he may be possessed of a great surplus of both.

Nevada.

TEN STAMPS MORE.—*Herald*, Jan. 27: The Providence Co., which has for some time past been running 20 stamps in their mill, are adding another ten, which will be ready in about a week. This is certainly encouraging.

Plumas.

GENESEE MINING ITEMS.—*National Bulletin*, Jan. 29: On Saturday A. Dragovich arrived from Genesee, where he has been superintending work on the old Cooper mine, now owned by the Genesee Queen Mining Company, whose office is at Carlin, Nev. This company has been running a new tunnel below the old one and now has driven it 75 feet. J. S. McDonald is busy driving a tunnel into the Lodi. This tunnel is now in 240 feet, but must be driven about 30 feet more to reach the desired point. On top a nice ledge of good ore exists. Not a great deal of work is now in progress at the Genesee mine. Mr. Gruss is expected to return in a short time, to resume active operations on that property. George Brandt has three men at work on the Centennial and is running the mill. On behalf of Goodhue & Hansen, a Chicago company, Mr. Dragovich is preparing to open up a gravel mine on Grizzly creek. A few days ago he let a contract to erect the necessary buildings. John Sobrero has a rich prospect above the Genesee mine. Mr. Dragovich had some of the ore with him as a sample. The extent of the prospect is not known, as sufficient work has not been done to determine that matter. This week Emrich & Swearingen resumed work on the Cosmopolitan and will drive the tunnel ahead. Geo. F. Brown is prospecting the Green Ledge. Indications are that these numerous operations will add to the life and business of Genesee valley during the coming summer.

THE SHENANDOAH MINE.—*National Bulletin*, Jan. 28: One of the historic mining camps of pioneer days is Rich Bar, at the mouth of French Ravine, of this county. Here it was that millions of gold were taken out in a few years, beginning in 1850. Among those who early went to this scene of activity and wealth was F. B. Whiting, for nearly 40 years a resident of Plumas and for 12 years her county clerk. Mr. Whiting knows the history of Rich Bar more thoroughly than any other living man. He has always contended that the fabulously rich deposits of gold on the Bar came from some great and rich quartz lode cut by French Ravine. In 1866, rich quartz float was found near the head of this ravine. This caused an examination of the hillsides, which resulted in a discovery of rich spurs of quartz, evidently parts of a lode across the canyon. Mr. Whiting organized a company to prospect the veins, but the venture proved a partial failure. In 1873 he became the sole owner. Having unlimited faith in the property, he expended considerable money in his attempts to develop it. Another company was organized in 1882, and work along the hanging-wall was resumed, many rich spurs being encountered,

but they were not extensive. Mr. Whiting was left alone again in 1883, but he continued, as circumstances would permit, the exploration work till 1888, when he organized a syndicate in Oakland and sold one-half of the property to the corporation. In the fall of 1891, a ten-stamp mill was erected and a test of the ore made, which resulted in partial success only. A short time since, the foreman began prospecting on the footwall of the lode and soon opened up an immensely rich body of ore. The vein is four feet wide and is considered one of the best propositions ever developed in the county. Gold in large quantities exists all through the vein now exposed. Mr. Whiting yesterday returned from a visit to the mine and brought with him a small sack full of samples. The piece seen by us weighed about 20 pounds. Gold could be seen all over it, and it is estimated that such ore would pay \$5000 per ton. Of course, not all of the vein is as rich as this piece, but is of high grade. Already, probably 150 tons of rich milling ore are on the dump, and there is every indication of a permanent ledge. Mr. Whiting is more confident than ever that this lode furnished to Rich Bar the wealth of gold secured by the pioneers in the early "fifties."

Shasta.

SOUTH FOAK.—*Shasta Courier*, Jan. 28: Mining matters are somewhat quiet. There has been some claim-jumping and trouble in consequence. Lewis has bought out the Eubanks, on Andrews creek, and is running some free-gold ore through the arrastre. Strecher has found a good ledge just east of the Chicago and is doing some work on the same. Dunham & Gillon are getting good ore on the Big Central. Bull continues to extract good ore from his mine and has a shipment ready. The work on the mill at Robinsons progresses as favorably as the tardy arrival of machinery permits. Wright is doing some good work on his gold ledges near home. E. E. Ballou's plant will be ready to start as soon as the balance of the machinery gets here—two or three weeks likely. Moody is running a lower tunnel on his ledge. Cooper is running in on the Hope to tap a chimney of rich ore on his north extension.

LOCAL NOTES.—Mining matters have been rather quiet the past week or two, but the presence of so many mining men from below is an indication that points to a general revival in mining matters in this vicinity. We have got plenty of good mines hereabouts, but the lack of money and muscle is the main obstacle in their development. Some small-calibered miscreant doped the Drury & Paige arrastre on Middle creek with a dose of lard, and work has been suspended for a while. The water supply is too low to furnish sufficient motive-power to run the arrastre at present. The Schroter boys began work on the old Reese mine, near town, and will get out ore for their mill. This mine has turned out some very rich rock. The storm, if it continues, will be a great benefit to placer miners, as the water supply in the creeks and gulches has about petered out. The Washington mill, at French Gulch, is still pounding away on good rock from the mine. This mine is the oldest in the State, and has probably produced more bullion than any mine in the county.

Sonoma.

VEIN EXHAUSTED.—*Sonoma Tribune*, Jan. 26: The Great Eastern quicksilver mine, southeast of Healdsburg, will close down with permanence in about a month, the vein now being almost entirely exhausted. This mine has been operated for many years and was the best paying in this part of the State. R. E. Lewis and A. Abbey are principal owners, and each realized thousands of dollars for their investment.

Tuolumne.

MILL.—*Tuolumne Independent*, Jan. 29: The 40-stamp mill at the Rawhide mine will be running in a short time, using 16 concentrators. The Black Oak mine has good developments recently, and intends to hold her own among Tuolumne mines.

Trinity.

THE TRINITY RIVER MINES.—*Cor. Journal*, Jan. 28: Just before arriving at Carr's place I met Dan Barker, who is prospecting for quartz on Maple creek, which empties into Dutch creek on the west side of the river a short distance from Carr's. He showed me several specimens which contained free gold visible to the naked eye. The tunnel is in about 70 feet, and taps the ledge about 25 feet below the surface. He says the rock will average \$25 per ton. James T. Anderson, Ed Treloar and D. C. Dedrick are interested with him in the above-mentioned claim. After leaving the Last Chance mine, I proceeded to Chapman & Fisher's at Arkansas dam. This property was at the time of the writer's visit being worked at the lower claim. Their water is obtained from Soldier creek and carried to the mine by a well-constructed, two-mile ditch 3½ feet wide on the bottom, 6 feet at the top and three feet deep. The bank is nearly 100 feet deep, and the gravel from 10 to 15 feet. A six-inch nozzle is used on the giant and the water issues from it with a pressure of 200 feet. There are two bedrock ditches—one 500 feet long and 40 feet deep, the other 400 feet long and about 50 feet deep. The sluices are 360 feet long and the undercurrent 36 feet long by 12 feet in width. Piping operations commenced several weeks earlier than usual this season; last year they did not begin until Feb. 8th. This fine property has been worked by the present owners for 21 years. The best cleanup amounted to \$24,000; the poorest \$10,000. About 25 acres of bedrock has been stripped, and there are over 100 acres left to be washed. Five men were employed at the time of our visit; eight men are employed on the average. Mr. Chapman raises on the place all the fruit and vegetables used by the family, and the writer can vouch for their excellence, as he

enjoyed the hospitality of Mr. and Mrs. Chapman, to whom he is indebted for courtesies extended. Mrs. G. S. Gribble's claim of 59 acres lies between the upper and lower claims of Chapman & Fisher, but owing to a very limited water supply, not more than about 2500 feet of bedrock is stripped in a season. This is said to be a good paying piece of property considering the small supply of water. Mr. Chapman ferried the writer across the river, and a short walk brought him to the Good Friday claim of 75 acres, belonging to T. E. Jones, Superior Judge of the county. Robt. Glover, Thomas C. Post and John S. Post. This claim was discovered about 1870, but has never been worked very much, as the water supply is very limited, being taken from the neighboring gulches and lasting but two or three months per season. At the time of our visit but one hour's run per day could be made. For the time of running it is said to pay well. A half mile below the Good Friday mine, on the same side of the river, we reach the Sberidan Bros.' property of 104 acres. They obtain their water from Simpson's gulch by about a mile of ditches and use but one monitor. There are about 1600 feet of seven-inch pipe in use. A bedrock tunnel 500 feet long carries the debris into the river. They were able to begin pining operations five or six weeks earlier this year than usual. Last year they did not commence until February 22d. Three men are employed at present, and there is about four hours of pining per day. The yield of gold is good. The next claim below on the east side of the river is that of Fred G. Haas, which is near Junction City. There are in this fine property 200 acres, 160 of which are covered by U. S. patent. Mr. Haas has been on the property 24 years, during which time he has produced many thousands of dollars. The upper ditch is 3½ miles long from Clear gulch on Weaver Bally, and brings the water to that part of the claim where he is mining now with a pressure of 380 feet. This ditch is splendidly constructed, and has a capacity of 750 inches. The lower ditch is of the same length and 152 feet lower than the upper ditch and with a capacity of 800 inches. There are three large reservoirs. The upper one in use at the time of our visit required one hour and a half to fill, and afforded a run of seven hours' duration. Four hundred feet of 15-inch pipe and two giants with six-inch nozzles are used. There are several bedrock ditches—one of 1000 feet in length and 30 feet in depth, another 600 feet long and 40 feet deep, another 200 feet long and 12 feet deep. The sluice in use at the present time is but 85 feet long, with an undercurrent 36 feet by 12 feet. The old flume on the west side of the claim is about 1700 feet long. A new flume, now in course of construction on the Oregon gulch side of the knoll, will be 442 feet long, and Mr. Haas expects to have it ready for pining operations by March 1st. Work has been progressing for several years on a knoll about 150 feet high and about 30 acres in extent, upon which there have been four distinct benches of gravel.

NEVADA.

Washoe District.

CON. VIRGINIA.—*Chronicle*, Jan. 28: Ore extraction from the 1500 and 1650 levels of Con. Virginia is now steadily continued, 450 tons having been extracted and raised to the surface during the past week. The company will commence shipping ore to the Morgan mill in a few days, and the mill will commence crushing early next month. Have extracted during the week from the 1500 level atopes and 1650 north-west drift openings and raised to the surface 450 tons of ore, average assay value of which, per mine car samples, is \$26.95 per ton. The ore bins are about full, and we will commence shipping to the mill in two or three days. The mill will commence running early in the month of February.

OPHIR.—1465 level.—The upraise started on the sill floor, on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground, 101 feet below the sill floor of this level, has been carried up 10 feet; total height, 96 feet, continuing in porphyry with quartz.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 19 feet; total length, 497 feet, and is in a harder porphyry formation.

UNION CON.—900 level.—The joint Union Con. and Sierra Nevada west drift has been extended during the week 22 feet; total length west from the joint shaft, 2867 feet. The face is in clay and porphyry.

UTAH.—340 level.—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 18 feet; total length, 41 feet; continuing in vein porphyry formation. The flow of water from the face of west cross-No. 3 does not show any decrease.

SIERRA NEVADA.—West crosscut No. 2 from Kenoeha tunnel, started from north drift, 800 feet in, has been advanced 26 feet; total length, 620 feet; face in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 22 feet; total distance west of the joint shaft, 2867 feet; face in porphyry and clay.

ANDES.—On 420 level north drift from east crosscut No. 1, north, was advanced 14 feet; total, 63 feet; formation, principally quartz.

GOULD & CURRY.—200 level.—During the past week, west crosscut No. 5, started 432 feet from main west drift, has been advanced 12 feet, passing through hard porphyry; total length, 270 feet. On the Suro tunnel level the joint north drift with the Savage Co. has been advanced 18 feet; total length, 858 feet; face of drift in hard porphyry.

BEST & BELCHER.—900 level.—West crosscut

No. 3 has been extended 20 feet through porphyry; total length, 107 feet.

EAST BEST & BELCHER AND NORTH GOULD & CURRY.—Drifting is being continued and quartz is being passed through that looks well.

HALE & NORCROSE.—1800 level.—West crosscut No. 1 from the main south drift was advanced 20 feet; total length, 75 feet; face nearly all quartz. No. 3 west crosscut from main north drift was advanced 20 feet; total length, 272 feet; face in porphyry. West crosscut No. 4 from main north drift was advanced 12 feet; passing through some quartz that contained small bunches of ore; total length, 122 feet; face in porphyry.

CHOLLAE.—The north drift from the south line, 550 level, is out 117 feet; face in low-grade quartz. Are retimbering the two north compartments of the main shaft. The east crosscut from the north drift, from east crosscut 160 feet south of north line, 930 level, is out 33 feet; face in porphyry.

POTOSI.—The east crosscut opposite the Potosi winze, 930 level, is out 283 feet; face in hard porphyry. South drift from top of raise, 1000 level, is out 74 feet; face shows five feet of quartz containing bunches of good ore. The north drift from top of raise, 1000 level, is out 24 feet; face is in porphyry and low-grade quartz. Are grading and timbering the connection between the northwest drift from the Ward shaft, 1800 level, and Potosi winze. Extracted and sent to the mill the past week 426 tons and 250 pounds of ore from the 550, 930, 1100 and 1150 levels. Milled during the week 426 tons; on hand at mill, 80 tons and 1250 pounds. Average battery assays, \$24.51. Average car sample assays, \$25.64.

BULLION.—The east crosscut, 100 feet north of top of raise from east crosscut, 320 feet north of south line, 1300 level, is out 50 feet; face is in porphyry and quartz. The west crosscut from the north west drift, 300 feet south of north line, 1800 level of Ward shaft, is out 220 feet; face in quartz and porphyry.

APEX.—Since last report have made connection by an apraise from the tunnel level to the bottom of incline, thereby obtaining a continuous current of fresh air throughout the mine, insuring us better facilities for rapid exploration of the mine on this level. The samples of ore from bottom of incline give an average assay of \$81.42 in silver and \$139.73 in gold; total \$221.15.

WARD SHAFT.—There has been no work done on the 1800 level of the Alpha and Exchequer during the week. The west crosscut from the northwest drift, 300 feet south of north line of the Ward shaft, 1800 level, is out 200 feet; face in quartz and porphyry. Are grading and timbering the connection between the northwest drift from the Ward shaft, 1800 level, and the Potosi winze.

EXCHEQUER.—Putting of pressure pipe in the Ward shaft is nearly completed.

ALPHA.—Putting of pressure pipe in the Ward shaft is nearly completed.

KENTUCK.—Have continued to extract about 3 tons of ore per day from the 7th floor above the east crosscut on the 160 level. Shipped to the Brunswick mill 129 tons of ore.

OCCIDENTAL.—The main north drift, 750 level, has been extended 16 feet; total distance from No. 1 winze 623 feet. The drift continues in low-grade ore. No. 2 winze from south drift, 750 level, is down 28 feet in low-grade ore. The main south drift, Suro tunnel level, has been extended 19 feet in hard porphyry.

NEW YORK.—Are extracting from 10 to 12 cars of ore per day; car samples averaging from \$25 to \$30 per ton. Are repairing southwest drift from the shaft, 850 level. Shipped to the Washoe mill during the past week 132 tons, 1132 pounds of ore; milled during the week 132 tons 1132 pounds ore; on hand at mill, 60 tons; average battery assays, \$30.19; average car sample assays, \$29.70. Shipped to U. S. Mint, Carson, 186 pounds of crude bullion.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 3 feet; total distance from north line, 36 feet. All underground work was stopped for three days during the past week on account of Justice Co. making repairs to the surface machinery.

Tuscarora District.

NAVAJO.—*Times-Review*, Jan. 28: No material change in the stope since last report.

BELLE LAKE.—The stopes above the 250-foot level have been extended northward in good ore up to the break. Good ore is now making south of the apraise.

NORTH BELLE LAKE.—The stope above the south 400-foot level and those above the north 300-foot level, are yielding about the same.

OREGON.

PROSPECTING.—Ashland *Tidings*, Jan. 27: From the amount of prospecting already under way in the mountains about Aebland it looks as if a custom quartz mill will be so imperative a necessity here soon that one must be put up. C. H. Veghte has made a proposition which is talked some on the street. Mr. Veghte already has a 40-horsepower engine, and agrees to set up and run a first-class five-stamp mill provided he is guaranteed the work of crushing 500 tons of rock at \$5 a ton. Somewhat of a sensation was made last Tuesday by the exhibition of the richest piece of quartz yet shown here—a little piece about half gold, which is said to have been found by the wife of Dr. H. T. Inlow in their dooryard on their little farm east of Bear creek. It may have come from a ledge there, or from the blue gravel deposit known to exist under the hills on the east side of Bear creek. John H. Real, C. H. Hosley and others went over with pick and pan to do some prospecting there yesterday. Keno, Klamath county, is the latest seat of gold excitement. A settler named Took, on the south side of Klam-

ath river, about 1½ miles from Keno, was digging a well, and at a depth of 60 feet he struck a formation from which he panned out \$1.50 in gold with an ordinary skillet. The gold was probably from the stratum of blue gravel which underlies a large portion of the lake and Klamath river country, and it may lead to the development of some good drift mines there. C. H. Hosley, M. L. McCall, Destin High and George Engle have located a claim angling from the west side line of the Ashland Mining Company's 4500-foot claim, and they believe they are on the main lode of the Ashland mine, the A. N. King lode, better known as the Patton lode, from the Patton extension of the King claim. Surveyor McCall ran the lines of the new claim Tuesday, and it is christened the Nancy Hanks. Wallace Rodgers and J. M. Hocker are at work running prospect cuts upon the claim. One day last week Messrs. Legg & McDonald, of Foot's creek, tired of working over ground which had for a long time failed to produce anything of consequence, went farther up the stream, taking out a few wheelbarrow loads to test the diggings. The very first washout produced a nugget of "old-channel" gold weighing \$170. In addition to this the wheelbarrow experiment panned out about \$6 in legitimate washing. The placer themselves are by no means completely washed out in southern Oregon. One of the largest straight string of mining claims yet located near Ashland is upon what is called the Blue Lead. It is a continuation of the ledge upon which Roper, Carter & Mills have sunk a prospect shaft on the hill in town. It is traced by a capledge on the surface for several miles in a direction nearly due south, and 13 claims have been located on it already. George Fendall is one of the locators, as are also railway mail clerks Knowles and Bangasser, of the Portland run. Mr. Knowles got a fine prospect one day this week from a piece of surface float from the ledge. Will Q. Brown, of Riddle, now employed by the large company to whom he sold his nickel mines near Riddle, was on Wednesday's south train, going to San Francisco. Mr. Brown says the machinery for the reduction works is at the Riddle railroad station, but cannot be hauled to the mines until the roads improve. It will be summer before smelting operations are begun, but when the mining is started once it will be upon a large scale. There is abundance of the nickel ore in that region, and the demand for the metal is good, since the approval of the nickel-steel armor plate for naval use.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JAN. 24, 1893.

490,265.—FRUIT STONER—J. S. Briggs, San Buenaventura, Cal.

490,272.—PENCIL SHAPEFENER—Geo. Diez, Santa Clara, Cal.

490,276.—PLOW—D. B. English, Guerneville, Cal.

490,608.—WRAPPING MACHINE—I. R. Hutchinson, Fresno, Cal.

490,609.—RIVET FEEDING DEVICE—J. H. Martin, Oroville, Cal.

490,610.—HORSE DETACHER—Wm. Mather, Sebastopol, Cal.

490,358.—ELECTEICAL MUSICAL INSTRUMENT—A. Montanelli, Portland, Or.

490,630.—ELECTEIC CONDUIT—E. L. Ransome, Oakland, Cal.

490,631.—CONCRETE MIXER—E. L. Ransome, Oakland, Cal.

490,632.—CONCRETE DISTRIBUTOR—E. L. Ransome, Oakland, Cal.

490,362.—FIRE ESCAPE ATTACHMENT—A. J. Rich, S. F.

490,400.—THREE WHEELED CARRIAGE—G. Rouy, Redlands, Cal.

490,617.—RATCHET TRACOR—Alfred Taylor, S. F.

490,528.—BEIDGE FOR MUSICAL INSTRUMENTS—Geo. Wooster, Fort Apache, A. T.

The following brief list by telegraph, for Jan. 31, will appear more complete on receipt of mail advices:

San Francisco—Louise Ericson, bicycle bell; Lorenzo O. Granger, trousers stretcher; George Johnson, ore concentrator (2). California—Melford D. Arms, San Diego, wood waterpipe; James S. Dunham and E. D. Middlekoff, Stockton, lemon-squeezer; Thomas H. Edwards, Lathrop, vehicle axle gauge; Alonzo Fisher and G. H. Priestley, Stockton, horse-hitching device; George W. Ingersoll, Stockton, grain-saving device in threshing; Norton H. Fine, Eureka, rope leader for winding drums; Albert O. Quimby, Fresno, gate hinge; Edward G. Smith, San Jose, electrical pressure indicator for steam gauges; Samuel R. Smith, Colusa, step-ladder; Charles W. Winston and F. Throop, San Gabriel, orchard plow.

Washington—John Fishburn, Walla Walla, safety valve for water gauges; Ernest Nichoff, Tacoma, egg puzzle; Andrew F. Fugb, Palouse, fabric-tuning implement.

Nevada—John W. Cummings, Gold Hill, electric bell.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BEAKE FOR HARVESTERS.—Christopher Gratian, Stockton, No. 490,197. Dated Jan. 17, 1893. The object of this invention is to provide a powerful compressor-brake for traveling harvesters, the parts of which are so mounted that

the brake is applied to opposite sides of the main driving-wheel, the shoes acting directly upon the projecting ribs, which extend radially outward from the rim of the wheel for the purpose of giving the wheel a sufficient hold on the ground over which it travels to drive the machinery connected with it. These machines are hauled by from 18 to 24 horses, and when the team becomes unmanageable, it is absolutely necessary to have some effective means for checking the speed of the machine, and through it controlling the team. This brake must preferably be applied to the wheel which drives the machinery and which has projecting ribs upon its face; and as there is no smooth surface of the rim for the proper application of a brake, it is a difficult matter to contrive such a brake as will be effective. The faces of these driving-wheels are from 16 to 20 inches in diameter, the ribs or grousers extending entirely across from one side to the other. This new brake can be applied to such wheels satisfactorily.

ADJUSTABLE ROCK-CRUSHER.—John P. Simmone and Wm. J. Holmes, S. F. No. 490,215. Dated Jan. 17, 1893. This invention relates to that class of rock-crushers in which an oscillating crusher-head is mounted within a shell, said head being carried and driven by a shaft which has a vertical adjustment, to regulate the position of the crusher-head within the shell and provide for reducing the rock to different sizes. The object of the invention is to provide a simple, economical and effective adjusting device for the crusher-head shaft, which can be readily operated, requiring the removal or change of none of the parts, accessible easily from the outside, and preventing the escape of the oil from the bearing box of the step on which the shaft rests. The adjustment of the shaft can be quickly accomplished from the exterior, and the adjustment can be regulated to a nicety.

DRAFT-EQUALIZER.—Peter V. Schandoney, Sacramento, No. 490,214. Dated Jan. 17, 1893. In hauling traveling harvesters upon the field, it is customary to attach large teams consisting of as many as 24 or more animals to haul the apparatus. These teams are usually hitched six or eight abreast and in three or more series, one series ahead of another. The attachments are made by means of draft and equalizing bars and singletrees attached to these bars, but as the animals all have different rates of walking, it is impossible to make them all travel alike, and by the means which are now adopted for connecting them with the load, it is equally impossible to bring an equal share of the load upon each animal or series of animals. Some of them being attached directly to the draft-bar of the machine, whenever the load is started they pull upon the whole weight of the apparatus, and the strain is unequally divided. This invention consists in the employment of connecting chains by which the draft-bars are so united as to yield to irregular pulls by different parts of the team, and thus counterbalance these pulls and practically divide the draft equally among all the animals of the team.

HOISTING AND CONVEYING MACHINERY.—Frank C. Birch, S. F., assignor of one-half to Louis Rosenfeld, N. Y. No. 489,785. Dated Jan. 10, 1893. The invention relates to that class of mechanism designed for hoisting material from a given point, conveying it thence to another point and there lowering it. The object of the invention is to provide simple and effective means capable of easy and accurate operation, for hoisting coal and other material from given stations, conveying it rapidly to another station, and there lowering and delivering it gently, whereby breakage is avoided. The invention consists in the novel construction, arrangement and combination of the traveling trolley and the means for operating it and hoisting and lowering the bucket or tub to and from said trolley.

HORSE-DETACHER.—Wm. Mather, Sebastopol, Sonoma Co. No. 490,610. Dated Jan. 24, 1893. This invention relates to the class of devices for attaching or releasing horses from the vehicle to which they are hitched, when, for any purpose, as by reason of running away or other dangerous conduct, it becomes necessary for the safety of the occupant to release the animal. The invention consists, in connection with the whiffletree and its support, of a detachable connection between them and means for holding said whiffletree normally in place and tripping it when required. It also consists in the novel construction and arrangement of the detachable connection between the whiffletree and its support, and in the means for holding and for tripping it.

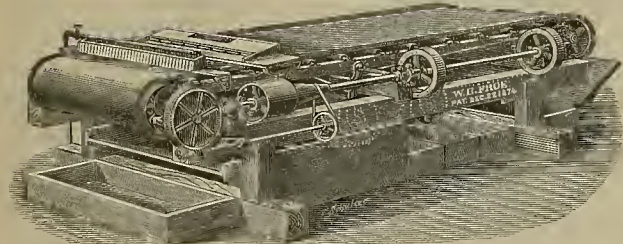
RATCHET-BRACE.—Alfred Taylor, S. F., assignor of one-half to Michael Cusack and Frank Knobloch. No. 490,617. Dated Jan. 24, 1893. This is a device for operating drills and similar mechanism in which the drill is caused to advance by the movement of a lever. It consists of a mechanism whereby an approximately continuous rotary motion is given to the drill by the reciprocation of a lever arm, and in certain details of construction.

RIVET-FEEDING DEVICE.—John H. Martin, Oroville, No. 490,609. Dated Jan. 24, 1893. This is part of the machinery for making sheet-iron pipe, and is designed to facilitate the riveting of the pipe. The object of the invention is to provide a simple and effective attachment to a pipemaker's stake, whereby the rivets are automatically supplied and forced successively to position to be readily introduced into the holes in the pipe, said attachment in no wise interfering with the operation of nipe-making or being in the way of the pipe-maker's stake.

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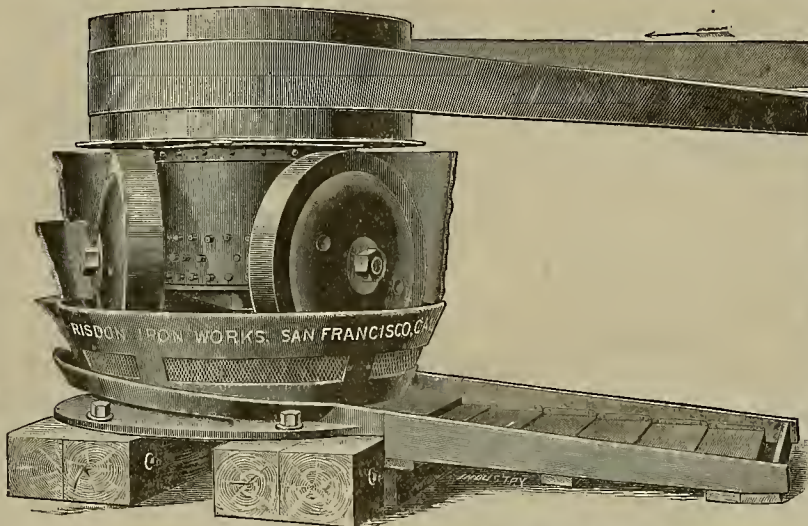
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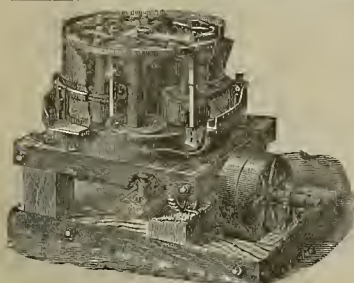
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VOL. LXVI. — Number 6.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 11, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Smelting Ores.

Smelting can only properly be carried out on special ores of lead and copper, like the carbonates, which reduce readily, or by a careful regulation of charges carrying lead or copper in other forms, and proper intermixture of fluxes. There are in some localities ores of both copper and lead which run down in furnaces with little addition except the necessary fuel; but sulphureted ores (copper pyrites and glauco and galena) cannot be so easily disposed of.

Omitting the complicated methods employed in large reduction works, the following are the methods used in mining camps:

First—The simple melting, in stack or water-jacket furnaces, of carbonates of lead or copper, or metallic copper ores. Some flux is usually required for the gangue rock, iron or lime if quartz, or quartz if too limy.

Second—Matting or running the minerals out of the rock, not in a fully metallic condition, but as a concentrated mineral or matte. This operation is conducted also in a stack or water-jacket furnace, usually after a partial preliminary roast. The matte is afterward refined.

Third—Partially roasting galena ores, oxidizing the lead and driving off much of the sulphur then a reducing smelting, in which the oxidized lead reacts on any sulphides remaining, and only metallic lead results. Here, as in the first division, proper fluxes must be added to slag off the waste rock and retain all the fluid in the furnace.

Fourth—The addition of iron ore, or roasted iron pyrites, to galena ores in smelting; the iron capturing the sulphur of the galena and leaving metallic lead.

A general description of the principles involved in the ordinary processes of smelting is all that is intended here, but the success of the last three methods depends on a proper mixture of ores, proper roasting and adjustment of fluxes. The cost of smelting ores varies from \$6 to \$25 per ton, and the yield of the ores thus treated is from 90 to 98 per cent of their assay value. On this page is given an engraving of the wrought-iron sectional water-jacket furnace, built by the Risdon Iron Works of this city. Sections may be added to this furnace to increase its capacity, as the output of the mine demands.

by over 300 installations in Europe, in deep mines, city water works (notably in the city of Paris) and for every pumping and compressing service. These pumping engines are to be supplied to the city of Boston, Mass., and Fraser & Chalmers are installing the first Riedler mining pump in the United States for the Boston & Montana Co.

A Set-Back to California's Petroleum Interests.

While California gives a small annual output of petroleum, as compared with Pennsylvania, New York and Ohio, it ranks with West Virginia and Colorado, and stands about sixth on the list of States in total amount produced. One company alone in this State has a capital of \$5,000,000 invested. The oil fields are mainly in Southern California and are being persistently developed so that the annual product is on the increase. The petroleum industry is destined to be a most important one in this State and should be encouraged. The Stewart mining bill now pending in Congress will, however, if it passes in its present form, be a great drawback to the industry not only here but everywhere in the United States. One of the provisions is that not more than 40 acres of petroleum ground can be included in the same application for patent. This would involve annual assessment work on every forty-acre tract, and a separate expenditure of \$500 before patent could be applied for. As the companies must have large areas on which to prospect, an immense useless expenditure is thus forced upon them. All the formalities for each forty-acre tract would have to be complied with, and they could not bunch a number of claims in patent proceedings. The passage of such a law would work irreparable injury to this industry and the interests involved have sent an agent to Washington to place the matter in the right light before Congress. The bill has, however, already passed the Senate and gone to the House. The Senators and Representatives from the other oil-producing States should assist the Californians in removing the obnoxious clauses from the bill.

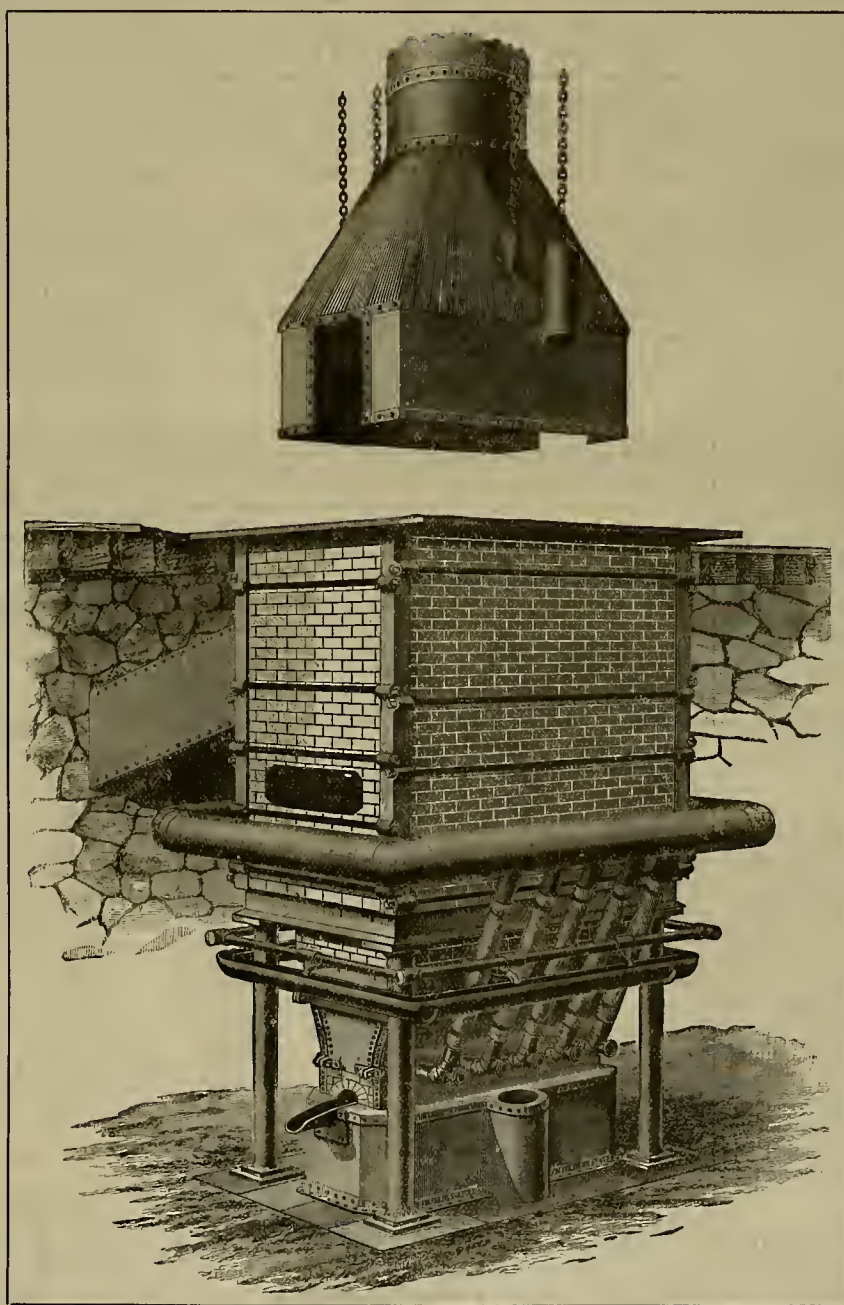
THE Senate Committee on Capital and Labor has reported favorably on the bill limiting a day's work in logging camps to ten hours. Also the bill to prevent contractors reducing the pay of employes on public works below the classification prescribed by the Board of Supervisors. Also the bill to compel corporations to pay their employes at least once a month.

SENATOR STANFORD has authorized the appointment of a Professor of Electrical Engineering and the equipment of a laboratory for the carrying out of the work of that department. The new power-house at Palo Alto

offers an excellent location for the dynamos near the source of power.

At Roslyn, Wash., the finding of a large vein of coal the other day, was announced by hoisting the American flag over the shaft tower.

SAN FRANCISCO received in January 115,360 tons of coal. Of this 47,537 tons came from British Columbia.



WROUGHT IRON SECTIONAL WATER-JACKET FURNACE.

This has 5½ inch and 8-inch plungers, 16 inch and 25-inch steam pistons, all 24-inch stroke. Its duty is 900 gallons per minute, lifted 600 feet.

THE Southern California Smelting and Refining Company, at Los Angeles, has begun the work of preparing ground for a smelter, and expects to have the machinery in place and ready for operation early in April.

RIEDLER PUMPING ENGINES.

Messrs. Fraser & Chalmers of Chicago are introducing into this country mining pumps and compressors of the Riedler type, of which they have control. The salient feature of these pumps is positive closure of the valves, which is so effected as to obtain the full lift, with increased speed, greater simplicity of construction, smaller number of valves, reduced wear and improved efficiency. These advantages over the usual type of construction are proved

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Our latest forms go to press on Thursday evening.

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San Francisco, February 11, 1893.

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 MINING SUMMARY.—From the Various Counties of California, Nevada and other Pacific States and Territories, 93-94.

Comment.

The paper on "Cable Surveys from California to the Hawaiian Islands," read by Lt.-Commander Z. L. Tanner, U. S. Navy, at the meeting of the Geographical Society of the Pacific, January 23d, was a very interesting document. It gave an excellent conception of the ocean floor, and the varying formations disclosed by the sounding-lead, as well as the difficulty of handling a ship tossing on the surface, while soundings are being taken at great depths. The feasibility of a cable-line to the islands was clearly demonstrated. This paper has attracted much attention, in view of political developments now taking place in Honolulu, as it is evident that telegraphic connection with that city is a necessity to the United States. If any definite action is taken which places the islands under the American flag, a submarine cable will be one of the first necessities. It would hardly do to leave those islands in the isolated position in which Alaska has been left, with respect to means of communication.

The Dakota tin mining business seems to have fizzled out like that of California. Superintendent Childs of the Harney Peak Tin Company has just returned to Deadwood from New York, and by his orders the mines of the company have been closed down indefinitely, throwing 300 or 400 men out of employment. The suspension caused great surprise throughout the Black hills as recent reports of the operations were of the most encouraging nature. Superintendent Childs refuses to give any information, except that the suspension will be permanent. This ends all the talk about the expected tin product of this country. No money has been made out of the operation either in this State or South Dakota. In fact the deposits never came up to expectation in quantity. Tin has been known in both the regions for many years and if the deposits had been at all as publicly represented they would doubtless have been worked systematically long since.

The cars on the new electric roads in this city and Oakland are run at a much higher rate of speed than are the cable-cars, more especially when on the outskirts of the cities. There have been several accidents recently because the cars could not be stopped quickly when running at a rapid rate. At all street-crossings there is danger of collision. The methods of braking ordinarily in use are inadequate, and there should be some restriction of the rate of speed unless means are adopted for bringing the cars quickly to a standstill. Air brakes for this class of cars have been tested recently on the Oakland, San Leandro and Haywards electric line and seem to have proved successful, so there is apparently a remedy if the companies will adopt it. The cars should not be permitted to maintain a dangerous rate of speed unless they adopt some

mechanical appliance by which they can be brought under control within a reasonable distance.

A lot of people at Wheatland, Yuba county, got together the other day, called themselves a mass-meeting, and adopted resolutions, which they forwarded to Congress, in which they viewed with alarm all efforts to secure by legislation the restoration of hydraulic-mining, and protesting against any modification of the penal clause of the Caminetti bill. Of course they had never read the Caminetti bill, did not understand its provisions, or that the miners only asked that the penal clause be suspended until the Commission could give them licenses to mine. On general principles, if the miners wanted something they opposed it. A week before, six miles from this same Wheatland, W. P. Lepp, of that town, found on the Frank Hunt place a nugget of pure gold valued at \$496.13. A month before the same man found within 20 feet of the same spot a nugget of \$264. Two years ago a former owner of the ravine picked up a lump of gold weighing \$263, and many smaller nuggets, weighing from \$1 to \$20, have been found at different times. The finding of the last large nugget has created quite an excitement in Wheatland. There is some talk of sending it to the World's Fair. The people of Wheatland ought at the same time to send to the World's Fair their resolutions against gold-mining in general. They would fit well with the nugget.

R. I. Thomas of Nevada county has earned the admiration and thanks of the mining community for the manner in which he opposed the bill increasing the fine in debris contempt cases. After his masterly speech, his motion to strike out the enacting clause was adopted by a vote which must have astonished the antidebris people. So that is the end of that measure, thanks to R. I. Thomas.

The Ford hydraulic-mining bill passed the Senate without amendment on Thursday by a vote of 37 to 2. This is the bill which permits hydraulic mining when it can be carried on without material injury to navigable streams. It also defines hydraulic mining. The two clauses are to be amendments to the code.

The Stewart Bill and the Drift Mines.

It would seem as if this Government objected to the existence of gold in gravel, were ignorant of its presence in that form, or desired to prevent miners from obtaining it except in mother quartz. The laws have almost obliterated the hydraulic mining industry, and now threaten that of drifting, and both of these branches depend on the presence of gold in gravel. The rulings of the Departments are such at present that it is practically impossible to obtain patent to drift-mining ground until it is worked out. Capital will not invest in land to which there is no title, and no title can be obtained in advance of the actual discovery of gold. As tunnels several thousand feet long are necessary to tap the auriferous gravel channels under the lava-capping, these must be run before the actual discovery, and all the work done in ground to which there is no title. Then when the gold is found and taken out no patent is wanted. All this is the veriest nonsense but it is department-made law and the miners must submit to it. The companies spend a hundred thousand dollars in or on a tunnel to open a channel, but the Department will not recognize a channel until it is absolutely found. Meantime an agricultural claimant may take up the surface and prohibit the miner from running his tunnel under the ranch. It is no wonder that the drift-mining interests of California languish under such circumstances.

And now comes another possible restriction in the provisions of the Stewart mining bill which has already passed the U. S. Senate and gone to the House. It cuts down the amount of placer ground which may be applied for in a patent to 40 acres. This would involve annual expenditure on each 40 acre tract, and a total expenditure of \$500 on each before patent would be applied for. In this class of mining the development of a large tract is usually done by a single tunnel and drifts. Assessment work done upon the surface of such properties is absolutely valueless as a rule. The sinking of a shallow pit upon each lot in a barren volcanic capping would be fruitless and a waste of time and money. The bill also calls for \$10 worth of annual labor on each 20 acres, but only 40 acres may be patented on one claim.

To justify the great expense of opening these deposits, it is necessary that the individual or company running the tunnel should own one or two miles in length of the pay channel. Owing to the uncertainty of the course of the channel, this involves the holding of from 500 to 1000 acres of ground, or even more. It is customary to take this up in 160 acre tracts and bunch adjoining tracts on application for patent.

The injustice of the proposed law as it refers to drift

mining in this State was called to the attention of Senator Stewart at the time of the introduction of the bill in 1889, but he has not seen fit to make any change in the provisions. There are no drift mines in Nevada, where the Senator comes from; in fact, California has about all there are, so it will suffer most. Our own Senators in Congress have probably paid little attention to the bill, considering the mining interests safe in Senator Stewart's hands. But the bill as it stands affects seriously not only the drift mining, but the petroleum interests of California, as pointed out elsewhere in the PRESS. It places restrictions upon these industries, which necessitate a large and useless expenditure, to no good purpose whatever. There is no distinction made between surface or exposed placers and those, like the drift mines, covered by the lava-capping of the "divides" of California. That there should be a distinction is apparent to any one familiar with the subject. Our lawmakers, however, seem to have only a superficial knowledge of these subjects, and will scarcely take trouble to investigate them, when asked to by those directly interested. Between congressional laws, department rulings and court decisions, the gravel-mining interests of California are having a hard time of it.

Status of the Mining Bill.

The Caminetti hydraulic-mining bill passed the Senate on the 4th, and went back to the House for concurrence. Having been given an advantageous position on the calendar by unanimous consent, it was called up without opposition, and it was tacitly understood, apparently, that there should be no lengthy discussion, that matter having been arranged beforehand by Felton and Stewart, who had made up their minds to make up for all the time lost on account of the wait for the arrival of Judge Niles Searles, the representative of the State Miners' Association. There was only one voice heard in opposition, that of Senator Cockrell, who has taken upon himself the task of watching the treasury doors for the Senate. He objected to the appropriation of \$15,000, and spoke briefly on that point. Senator Felton made a brief explanation of the measure, and without further debate the bill passed. It now devolves upon the committee to see that the amendments are concurred in at once, or, that failing, to have the conferees arrive at an agreement without delay.

On Tuesday the bill was called up in the House by Mr. Caminetti, and it was sent to a conference, the House non-concurring in the Senate amendments. When the conferees have agreed, the bill will come under the head of privileged matter and will be finally passed in both Senate and House without delay. The conferees are Stewart, Felton and Mills for the Senate and Cowles of North Carolina, Caminetti of California, and Townsend of Colorado for the House. The conference committee is to consider a modification of the Berry penal clause, but whether they will adopt it or not is not at this time (Thursday) known.

The miners have not asked that the penal clause be stricken out. They have only asked that it be modified so as not to apply to mines now legally working, which would be compelled to shut down under the provision. Failing in this, they ask that the activity of the penal clause be suspended until the U. S. Commission is organized and ready to grant the licenses to mine required by the bill. The reason for this is that it may take a year or two for the Commission to formulate and adopt its general plans and be ready to issue commissions. Pending that time, all mines will have to close unless the clause referred to is modified. It should be remembered that the miners do not ask to have the modification apply to all mines in the State, but only to those which are working legally with restraining works, or where they are otherwise doing no damage. At the same time, it must be confessed there is a division of opinion among the miners as to the advantages of the bill as it stands.

Coal and Iron on the Pacific Coast.

The foundrymen and other iron manufacturers of this city have united in a petition to Congress (printed in another column) asking for the abolition of duty on coal, iron, iron ore, coke, scrap iron and scrap steel. The fuel used here in the melting and blast furnaces is all imported and pays 75 cents a ton duty; while over 90 per cent of the iron and steel scrap used has to be imported. Under these circumstances the iron industries of this city and coast cannot flourish, nor can they compete with Eastern establishments favorably. Of course, in matters of this kind, a tariff revision cannot be applied to one section of the country, but must be the same in all. For this reason, the petition will naturally meet with powerful opposition in the East, as the Pennsylvania "iron barons" would seriously object to any such step. However, it would seem as if such necessities as coal and iron should be procured as cheaply as possible. On this coast we are working

scarcely any iron deposits and depend largely on foreign coal.

The vessels which come here for wheat bring quantities of pig iron, but all the rest that is used comes across the continent. The tariff on one hand and the railroad freight on the other make the cost of the raw material excessive. This has been one of the factors in all cases where San Francisco machine-builders and contractors for iron or steel work had to bid against Eastern men in the same business, and it has always been a big draw-back to the local trader.

It will be seen that the largest firms in the city have signed this petition, including the Pacific Rolling Mills and Union Iron Works, which employ several thousand men. Could the articles mentioned be put on the free list, our manufacturing interests here would immediately feel the effect, and there would be more of them. This movement has nothing to do with politics, but is pure business. Many of the signers of the petition are prominent protectionists, but they feel that under present conditions the manufacturing industries of California do not have a fair chance.

Coast Industrial Notes.

THE starch factory at Petaluma is nearly completed and in a few weeks will be ready for operations.

THE Yolo Board of Supervisors has selected a site in Woodland as the location of the County High School. It is intended to begin at once the erection of a \$17,000 building.

A MEETING of the citizens of Fresno was held Tuesday to consider the Monterey and Fresno railroad project. Considerable interest was shown in the scheme, and \$20,000 of the \$75,000 asked by the projectors of the road was subscribed. A committee on subscription was appointed to solicit the remainder.

THE Southside Improvement club at a meeting this week decided to do all in its power to raise a subsidy of \$125,000 toward building the Metropolitan electric road to the ocean beach. The quarters at 640 Market street have been rented for the purpose of collecting this money, and Mr. Pope has promised that he will attend to the office.

THE Piedmont Cable Company is putting in another sharp curve at the corner of Fourteenth and Washington streets in order to run its electric cars down the latter street. A protest has been entered against this curve and the company has agreed to arrange its road so as to please the property-owners.

THE first solid train of California canned fruits ever shipped by rail to one dealer in this country left San Francisco on Wednesday for D. M. Steele & Co., Omaha, Neb. The shipment consisted of twenty-three cars, containing over 4000 tons. The train goes via Central and Union Pacific and will run through on special time by daylight.

THE Italian fishermen, who recently dissolved the union by which the sales of fish were restricted, and had commenced sales at competitive rates, have decided that there is no money in such business and the old scheme has been restored. The result has been very satisfactory, as the men who had been losing from \$15 to \$20 a week are now that much ahead.

THE House Naval Committee has decided to make no provision in the Naval Appropriation bill this year for new cruisers or battle ships. One new \$400,000 gunboat is the only vessel provided for. The total appropriation is \$2,000,000 less than last year. This is unfortunate for our local ship builders, for if there is only one vessel the East is apt to get it to build.

WORK has been commenced in Los Angeles on a large five-story brick building for the Oudahy Packing Co. buildings. When completed they will cover an acre of ground and will cost about \$150,000. The full capacity of the factory will be 500 hogs and 150 cattle per day, and when running in full force it will employ at least 200 men. It is estimated that the tributary territory south of Bakersfield now pays out annually for Eastern hog products nearly a million and a half dollars.

AN act to provide for the establishment and maintenance of a training-ship for the instruction of the boys of California in nautical matters has been recommended by the Chamber of Commerce for passage by the legislature. The act calls for the State of California to appropriate the sum of \$100,000 therefor, and the authorizing of the Governor to procure from the Government a ship of suitable size and tonnage for the accommodation of 230 boys.

AT a meeting of the Trustees of the town of San Rafael, held this week, bids were opened for an engine for the town pumping works. Considerable rivalry existed between the bidders, there being seven. Some bids were rejected, as they were not accompanied by a certified check, as required by the Trustees. After considerable wrangling the contract was awarded to A. L. Fish of San Francisco for \$15,000, he being the lowest bidder. Fish is the contractor who put in the new plant which has just been completed.

H. A. McCRAVEY, of the Lakeport *Avalanche*, Lake county, says: "We have been needing a railroad for a long time now, and I think we are about to get it. Three different companies have been figuring to run a road from either Pieta or Hopland, on the Donahue line, to Lakeport, via Highland Springs. The proposition has been for us as citizens to raise \$50,000 by subscriptions and they would build the road. The matter has been receiving our attention for some little time. We have got \$30,000 raised, and there is no doubt that we will secure the remainder. The road will be about 25 miles long and will cost in round figures about \$350,000 besides the subsidy. It will be an

electric road and will admirably suit the needs of the people. The line will go through Big Valley, one of the richest sections of northern California, a region of fine farms and orchards, and there will be much produce of this kind to carry out.

WORK on two of the tunnels between Santa Margarita and the town of San Luis Obispo is making good progress. The first tunnel south of Santa Margarita, which is the longest of the seven, being 36165 feet long, is now being bored at both ends. A day and a night force is at work and 430 feet of the tunnel is already completed. The work progresses at the rate of ten feet a day, so that it is calculated that it will be finished in 316 days from the time the first shovelful of dirt was moved. On the next tunnel only a day force is now at work.

CLOSELY following on the recommendation of San Pedro as a site for the Government harbor comes the news that the Southern Pacific Company will soon begin work on an important improvement on its San Pedro line. The long trestle which crosses the Wilmington slough, between the two towns of Wilmington and San Pedro, is to be replaced by a solid embankment. Work will be commenced at once at filling up the trestle with stone and soil, and will be continued until the pile work is supplanted by a more solid foundation for tracks. The growing traffic of that branch and the age of the timbers in the trestle call for substantial improvement.

REPRESENTATIVE CAMINETTI of California has introduced in Congress a resolution directing the Secretary of War to cause to be made, under the supervision of the Chief of Engineers of the United States army, examinations or surveys, or both, of the navigable waters of the river system tributary to the bay of San Francisco, with the view to permanent improvement for the purposes of commerce and navigation, by means of levees or otherwise, so as to obtain the following depth: At low water, nine-foot depth to the city of Stockton, three feet to Hill's Ferry, seven feet to the city of Sacramento, three feet to a point near Chico, 30 inches to McIntosh Landing, 20 inches to Red Bluff, 30 inches to the city of Marysville, and to report the result thereof to Congress on or before November 1, 1893, with complete plans and details of the same, together with estimates of the cost.

INDICATIONS point to the establishment of a new railroad through the Santa Clara valley, to be owned and operated by the San Francisco and Santa Cruz Railroad Company. The company was originally formed for the purpose of building a railroad between Ravenswood and Gilroy, one from San Jose to Alviso, and one from San Jose to Saratoga. The first named road will be operated under the name of the San Francisco and Santa Clara Railroad, and the last two under the name of the San Francisco and San Jose Transportation Company. It is intended to connect Ravenswood with San Francisco by steamers. One of the promoters of the new road says that the details have all been arranged and that work will commence in a short time. He adds that the necessary equipments of the road have been contracted for and that some of the material is now on hand. Part of the road is expected to be in running order on May 1st next.

SUPERINTENDENT RUTHERFORD of the California Cotton Mills at East Oakland gave some interesting facts about that industry last week before the Senate Committee on State Prisons, which is considering the bill to establish a cordage factory at Polson. The cotton mills never employed Chinese, and had, during the past eight years, paid out over a million dollars in wages. The company had put in very expensive machinery, and was largely engaged in the manufacture of twine, cotton and jute cordage. He supplied the hop growers with all their twine and the fishermen from San Diego to British Columbia with tackle and cordage. There was not room for another factory. He claimed that the factory proposed would be very expensive. The \$190,000 would be but a trifle of the whole cost. The cotton mills employed about 100 men and boys and 100 women and girls, paying laborers about \$1 a day, but to skilled help \$50 to \$90 per month, and the company had been declaring five per cent dividends.

THE report of E. C. Prieber, Viticultural Commissioner of Napa county, has just been issued from the State Printing Office. When the last census was taken, Napa county reported 18,299 acres in vines. The present report shows a decrease to 16,651½ acres. Of the 507 vineyards in the valley, 244 report phylloxera. The disease is now spread over 2246 acres. Whenever resistant vines have not been used, the death of the vines appears to be only a question of a short time. The reports of wine stock show that there are 5,000,000 gallons now in the valley. The commissioner stated that no remedy to prevent the spread of the disease had been discovered, and at only two of the entire number of vineyards visited was the disease being specially treated. As a rule, vineyardists have come to the conclusion that any special treatment is useless. The report states that some of the cellars are overstocked with wine of the vintage of four years ago, and prices are considerably below the figure desired.

THE Alaska Packing Association was incorporated this week with \$5,000,000 capital stock. The directors are E. B. Beck, E. B. Pond, Isaac Liebes, Chas. Hirsch, H. F. Fortman, Sidney M. Smith, Geo. W. Hume, H. A. Williams and S. B. Peterson. The company has paid out already \$3,000,000 for 27 Alaska salmon canneries and has \$2,000,000 left for sinking capital. The new company is to allow only such a catch each year as the market calls for. The canneries will therefore be run to that same purpose. Prices will remain just as they are, for the very good reason, if no other, that salmon are too plentiful to be a luxury. For the canning business the commodity must be one of general demand or else our business could not be made to pay. If prices were raised the commodity immediately becomes a luxury, and the demand would necessarily fall off. There is absolutely no profit in the business unless our goods can be placed on the market so that they can be purchased by everyone. When the market was overstocked during the past few years it did not make

a particle of difference in the prices. Warehouses and canneries, as well as stores, were packed. Salmon, in cans, keeps readily, and no sales were made under the regulation prices, hence every once in a while the canneries became silent and men were thrown out of employment. Now, they will run all the time, but will only furnish what the demand calls for. The demand is increasing yearly and last year when the canners combined under the form of a lease of all their institutions, the output was 685,000 cases, as against 347,000 for the year previous. The catch two years ago was just as large, however, as last year, and it is there that you can see the wanton loss of fish. The Sacramento River is about dead, so far as salmon is concerned. Two years ago the output from there was 235,000 cases, and only 5000 cases were obtained last year. That kind of business cannot possibly continue without eventually killing all the fish in the Columbia and Alaska waters as well.

AN interesting lecture on the subject of natural gas in the San Joaquin Valley was delivered Monday night to the members of the Academy of Sciences by W. L. Watts of the State Mining Bureau. Mr. Watts spoke of the way natural gas was discovered in the valley, and of its commercial benefit to the State. He also said that a series of experiments were made by the State Mining Bureau to determine the fuel value of the Stockton gas. Repeated experiments with gas from seven different wells showed that 1,000 cubic feet of gas had an average fuel value equal to that of 50 pounds of coke carrying 10 per cent. of ash. Mr. Watts also said that a review of the different wells which have been bored at Stockton shows that the deepest produce the most gas. One well that is nearly 3,000 feet deep produces 80,000 cubic feet of gas daily. Mr. Watts thought it would be very advisable that a deep experimental well be bored to ascertain the gas-yielding formations, and whether the water can be excluded by tightly casing the upper portion of the well.

THE officials of the Southern Pacific Co. are taking steps to convert from a narrow to a broad gauge the line known as the Santa Cruz division, which runs from this city to Santa Cruz. All freight shipped from stations on the road to points on broad-gauge roads, or out of the State, has to be transferred from the small cars to the large ones, and the business has grown so great that the rehandling has proved a nuisance. The officials deny that any change will take place for many years to come, but the fact remains that many preparations are now being made to lay a third rail in order that broad-gauge freight trains may be run over the road. Work of laying a third rail from Alameda to Los Gatos, at the foot of the Santa Cruz mountains, is being carried on and the officials expect to have broad-gauge trains running between these points by next fall, that they may take out the large fruit crop without rehandling it. None of the many tunnels on the road are wide enough to admit of the passage of broad-gauge cars, and experiment is about to be made to ascertain the cost of enlarging the narrow-gauge tunnels. Lumber and timbers are now on the ground at Rincon, a point two and a half miles north of Santa Cruz, where there is a short tunnel and which was chosen as the best place to learn the cost of remodeling tunnels.

A. HOGG, President of the Midway Lumber Company of Kansas city, Mo., who has been buying shingles in the Puget sound country, in speaking of the trade says: "You ask me why I go to Puget sound to buy my shingles and why California redwood could not be used in every way as well as Washington cedar? I will tell you. California redwood makes as good shingles as any of the woods which grow on the Puget sound, yet there is a difference of 20 cents a 1000 between shingles made of redwood and those from the cedar of the northwest. The lack of transportation is against the use of your redwood for the making of shingles. The freight rate on shingles from Portland and the Puget sound countries to the East is 55 cents per 100 pounds. The rate east from San Francisco is the same, but you must remember that redwood in any considerable quantity comes from Humboldt and Mendocino counties and it must be transported to San Francisco by water. This rate added to that of 55 cents per 100 makes the Washington shingle 20 cents cheaper than the one made from California redwood. When you extend your facilities of transportation in such a way as to bring your redwood under similar rates with those of the cedar from the Sound countries it will find a great demand and ready market in the East. California redwood makes one of the finest shingles in the world, and it seems a pity that so little of it is in the market.

THE condition of the market for canned salmon as described in the trade circular of the Cutting Packing Company is as follows: The market is devoid of any interest, stocks in first hands being exhausted and transactions confined to small parcels wanted in distributive trade. A vessel having been laid on here for New York at a nominal freight to avoid taking on ballast has had the effect of moving quite a line of Alaska fish from here to Atlantic points, but it was all sold prior to shipment and was only waiting some such favorable opportunity to secure cheap transportation. Preparations for the coming season's pack are being made and supplies being purchased for use, both at Columbia River and at Alaska points. It is expected that the high price for raw fish on the Columbia prevalent for several years past, will be maintained by the fishermen the present season, and the proposed combine among the canners will end as it commenced—"in talk." The Alaska canners have been more fortunate in arriving at an understanding, and while the majority of those interested have deemed it wise to act for common and mutual benefit, quite a number have preferred to retain their individual interests and manage their affairs as it seems best to them; so consumers need have no fear of their being any monopoly; and although no prices have yet been made on the Alaska product, some sales have been effected on whatever may be an opening price. Free engagements are reported of British Columbia brands and at good prices. Reports from all consuming markets indicate a satisfactory and healthy condition.

Borax.

Borax is a substance produced in the United States, only in California and Nevada. Immense quantities are taken from the fields which lie on the borders of these two States. By reason of the many useful purposes to which this salt has come to be applied, we have thought it worth while to compile and roughly classify some of these uses, taking them in the order of their seeming importance.

CURATIVE AND REMEDIAL.

Although the largest consumption of this salt is made by the preservers of meat, fish, etc., it finds its most beneficent uses as a purifying and curative agent. According to the United States Dispensatory, it is a mild refrigerant and diuretic, useful in diseases of the kidneys and other urinary organs, also calculus, a complaint due to an excess of uric acid. On the same authority, borax may be employed to great advantage as a gargle in cases of diphtheria and other ailments of the throat; also in colds, hoarseness, sore mouth or thrush, a peculiar soreness of the mouth, accompanied with dryness. For these latter troubles make a pint of strong sage tea; take one-half ounce alum, a lump of borax size of a large marble, pulverize these fine and put in the tea and sweeten well with honey; dose, tablespoonful for adult, teaspoonful for a child, to be taken after eating or drinking. For a throat gargle, make a strong solution of borax and common salt, mix with glycerine or honey; gargle thoroughly; it kills the deadly microbes, bacilli and the like. A bit of crystallized borax the size of a pea dissolved in the mouth relieves hoarseness and coughing and loosens the mucous gathering in the throat. For cold in the head and catarrh, snuff a pinch of the powdered salt up the nose. For epizooty in horses, place four ounces pulverized in the grain daily. For eczema, scrofula, ringworm and other cutaneous diseases, wash well with castile soap and then with a strong solution of borax and vaseline. Mixed with glycerine, it forms the best possible dressing for ulcers, also wounds, especially where there is proud flesh or gangrene. Borax is not to be used internally except by the advice of a physician. The bottle, tube, nipple or other implement used in the nursery should be washed in a hot solution of borax every time it is used.

IN THE HOUSEHOLD.

Powdered borax is an excellent insecticide; mixed with an equal quantity of gum camphor, it becomes more effective. It kills or drives away cockroaches, black beetles, ants, etc., scatter over the shelves or under the paper that covers them. It does not, like some other insecticides, endanger either human or other animal life. It should always be added to dishwater because of its detergent and purifying properties. Borax water should be boiled for 15 minutes every week in the coffee-pot to sweeten and cleanse it. It softens water hardened by the presence of lime or other substance. It is much better than soap or soda for washing glass and tinware, also painted or varnished wood, the coating on which soap, soda, and even ammonia, tend to remove.

LAUNDRY.

In the laundry this salt is a most valuable auxiliary not only because of its detergent properties but because it does not, like most other powerful detergents, injure the fabrics to which it is applied. On the contrary, it tends to soften and preserve them. The washerwomen of Holland and Belgium have long been noted for the excellence of their work, their linen being unrivaled for its softness and whiteness, a result due to a free use of borax in their lavatories, their practice being to add about $\frac{1}{4}$ of a pound of powdered borax to 5 gallons of water. This being a neutral salt does not injure the finest lace or other delicate fabric, which will not bear rubbing or being washed with soap or other of the caustic alkalis. In treating these the practice is to leave them in a weak solution of borax over night, then carefully rinse several times and press out the water without rubbing. In cleansing coarse fabrics this salt may be employed in connection with or as a substitute for soap. In washing blankets or other flannels put a tablespoonful of borax to a pail full of cold water; make a strong suds from good soap and throw both into the tub, rinse well in cold water, each time pressing or snapping out the water, then hang out to dry—do not wring. One teaspoonful powdered borax added to each quart of boiling starch increases the stiffness of articles to which it is applied, also imparts an additional glaze. The yolk of an egg, a little powdered borax and a teaspoonful of the spirits of camphor in half pint of tepid water takes the spots out of black goods. When red or white table linen is to be washed add borax to the water; when blue and white, sugar of lead. Always use a little borax in the bath; also in washing colored clothes, as soda has a bad effect on these.

TOILET.

In none of its minor uses does the employment of this salt serve a greater variety of desirable ends than in making the toilet. It is nature's best cosmetic. While it invigorates the skin it freshens and beautifies the complexion—for improving the latter nothing equals it. It also tends to purify the breath and preserve the teeth. For general toilet purposes, including shampoo, washing hands and face, cleaning comb and brush, etc., pour the refined into a bottle of warm water till no more will dissolve; pour off into another bottle and add half as much more water and shake well. If not clear let it stand till clarified, then pour off clear or filter through paper; can be used as a mouth wash, also to remove the odor of perspiration, etc.

For coarse, open pores on any part of the face 2 tablespoonfuls of borax dissolved in $\frac{1}{2}$ pint boiling water; add a little alcohol or cologne; wash frequently. For sunburn mix 6 grains borax and 1 ounce lime water with $\frac{1}{2}$ ounce of oil of jasmine and some oil of almonds. For freckles, 1 teaspoonful borax, 4 ounces lime juice and 2 tablespoonfuls of

candy sugar; mix well and add a little cologne water. For retaining the hair in curl dissolve 2 ounces borax, 1 dram gum arabic in 1 quart hot but not boiling water; add 3 tablespoonfuls strong spirits camphor; on retiring wet the hair with it and roll in twists or paper till morning. The unguent used by Sarah Bernhardt to keep the hands soft and white consists of equal parts lemon juice and glycerine with a little borax, with the triple extract of violets added.

AS A DENTIFRICE.

Four parts prepared chalk, four parts borax, two parts castile soap, a little pumice stone, all finely powdered and mixed and flavored with wintergreen, make a good and cheap dentifrice. The fancy preparations, though they cost a great deal more, do not make so good a tooth-powder as this, though most of them contain some borax.

FOR PRESERVING MEAT, FISH, ETC.

The large meatpackers and fishcannery employ borax by the carload for preserving their products, which, without injuring their healthfulness or their flavor, can, through its use, be kept good for an indefinite period. This salt possesses the peculiar and valuable property of destroying the organisms, both animal and vegetable, on which fermentation and putrefaction depend. A light sprinkling of this powder over meat will keep it good for some days. It is removed by pouring over it a little warm water. One part in a thousand will prevent milk souring for 24 hours—a quantity not injurious. Generally, however, this salt should be used only in accordance with a properly prepared formula. The extent to which the use of borax for curing meat has increased is shown by the fact that in 1883 the packers of Chicago, Kansas City and St. Louis employed for that purpose not more than 2000 pounds, whereas their consumption now exceeds 3,000,000 pounds.

MANUFACTURING AND METALLURGICAL USES.

In several of the economic industries this invaluable salt finds a place. The potters use it in enameling and glazing their wares; the calico printers as a mordant in drying; the plasterers in slacking lime, which it tends to harden and render fireproof; the hatters for making a varnish, which, boiled with shellac, gives stiffness to their fabrics. It is also used for manufacturing a soluble cream of tartar. Dissolved in water and mixed with linseed oil it makes a cheap paint. In connection with casein it can be substituted for gum. It is superior to alum for rendering cloth and like substances fireproof. It forms a valuable addition to all kinds of soap. It tends to the preservation of wood. From a mixture of boracic acid and milk an artificial ivory is made, well suited for billiard balls, combs, etc. Borax is much used in assaying and metallurgy, especially in the smelting of copper ores. The performer of strange and startling feats suffers no inconvenience from licking a bar of red-hot iron, if only be first take into his mouth a properly prepared solution of borax and alum. In view of its many and important uses, a supply of borax should be kept constantly on hand in families. Better be without many of those other articles usually deemed indispensable in the household, than without this salt, an adequate supply of which costs comparatively little.

The "Bally" Cam for Stamp Mills.

The "Bally" cam is an appliance now successfully working at Johannesburg, Transvaal, (Africa), on the quartz mills there. Chas. Raleigh & Co. (limited) have sent us circulars, from which we take the following:

Up to the present it has been the practice in millwork to build each five-stamp battery with all five cams either on the right ("right-hand" batteries) or on the left ("left-hand" batteries) of the stem-rod, consequently each stamp revolves in one and the same direction.

The immediate result of this "one-sided" arrangement is: 1st, a heavy side thrust on one cam-shaft bearing, causing excessive friction; 2d, the stamps fall to the one side of the dies, wearing them unevenly; 3d, the ore is caused to "silt" to one end of the mortar-box.

When a right-handed cam in motion engages a tappit, the stamp is thrust to the left (as far as the guide-block will permit), the cam and cam-shaft travel to the right, until the right-hand collar grinds hard up against its adjoining bearing. As the motion continues, and the cam lifts the stamp, the stem-rod travels sideways up the guide-block, and on falling (unless the guide-blocks are quite new) drops to one side of the die, and gradually wears the latter unevenly. The uneven die has then to be replaced, although only perhaps half or two-thirds worn, as it is past efficient duty, and liable to break the stem-rod. The result of the stamps continually revolving in the same direction is to "bank" or "silt" the ore to one end of the mortar-box, and effectually prevent the end stamp from doing its full duty. Thus it will be seen that a "one-sided lift" must necessarily cause a one-sided and unequal wear and strain over the whole of the battery, and result in an excessive expenditure on repairs of its wearing parts.

The patent "Bally" or balanced cam is introduced for the purpose of mitigating the evil effects resulting from a one-sided lift as exerted by the right or left-handed cam, and is simply a combination of the former and latter, each stamp being alternately lifted on its right and left-hand side, and revolved in these alternate opposite directions.

By arranging the order, there is always a right and left-hand cam engaged at the same time, their "thrusts" equalize each other, and the cam-shaft runs balanced between its bearings, the collars running free of the latter.

To gain this result six cams are used, having a total of only ten arms, there being four double-armed and two single-armed cams employed.

The double-armed cams are both right and left-handed, that is, they operate first on the right-hand side of one stamp, and then on the left-hand side of the adjoining stamp. The results of the use of this cam are claimed to be: less friction, level wearing of dies, greater crushing efficiency, higher speed, greater rigidity and less danger in cleaning up.

Free Coal and Iron Wanted on the Pacific Coast.

A mammoth petition to Congress, praying for the boon of free coal, iron ore, coke, pig iron, etc., and signed by 120 of the heaviest manufacturing firms of San Francisco, is on its way to Washington. Many of the signers are Republicans in politics. It is a nonpartisan commercial cry of the Pacific Coast. The document is as follows:

To the Senators and Representatives in Congress of the Pacific Coast States and Territories: We, the undersigned, members of all political parties, engaged on this Coast in iron and steel manufacture, respectfully submit the following facts:

First—That these industries are now in a deplorable condition.

Second—That owing to the quality of Coast coals, we are obliged to import the fuel used in melting and blast furnaces, which imposes on us a special tax of 75 cents per ton, and does not benefit even the native coal producers.

Third—That owing to the insufficient local supply, we are forced to import 90 per cent of the iron and steel scrap used in our business, which, on account of the cost of transportation, could not be had from any native source.

And finally, believing that were the duties removed on the materials named hereafter, a marked impulse would be given to the manufacturing industries on this Coast without detriment to any other established interest or section of the country, we request that in the revision of our tariff, which now seems imminent, you urge the insertion of the following provisions:

That iron ore, coal, coke, pig iron, scrap iron and scrap steel shall be placed on the free list.

Pacific Rolling Mill Co.
Judson Manufacturing Co.
Pacific Iron Nail Co., by H. J. Sadler, Pres.
Risdon Iron and Locomotive Works, by W. H. Taylor, Pres.
Union Iron Works, by H. H. Scott, Pres.
Ralston Iron Works.
Bigelow & Little, Iron Works.
Joshua Hendy Machine Works.
Fulton Engineering and Ship-building Works.
Union Gas Engine Co.
Phoenix Iron Works.
Pioneer Iron Works.
Payne's Bolt Works.
Main-street Iron Works.
Vulcan Iron Works.
Pacific Saw Manufacturing Co.
Benicia Agricultural Works.
N. W. Spaulding Saw Co.
William Wedgewood Machine Works.
C. F. Murwedel, machine supply m'trs.
Williams & Orton, general machinery m'trs.
San Francisco Tool Co., by J. R. Spring, Pres.
F. W. Krogh, m'trs pumping machine v.
Todt & Peters, housesmiths.
W. H. Birch & Co., iron m'trs.
Western Iron Works.
Thompson Bros., Foundry.
G. A. Nolte, Eagle Iron Foundry.
McIntosh & Wolfman, machine works.
J. Weinheart, California Tool Works.
California Iron Screen Co.
Dow Steam Pump Works.
C. H. Evans & Co., machine works.
Cyclops Machine Works.
Pacific Tin Sheet Iron Works.
W. Farren, wagon m'trs and builders.
Phelps Iron Co., by J. R. Phelps, Sec.
Cabill & Hall Elevator Co.
Pacific Coast Boiler Works.
California Saw Works.
C. F. Littell, tin and sheet-iron works.
National Iron Works.
Joseph Wagner Manufacturing Co., mill machinery.
Union Machine Co.
A. J. McNicholl & Co., elevator builders.
The Pelton Water-Wheel Co.
George H. Myer, Novelty Iron Works.
Perkins, Brandt & Co., pump works.
Golden West Iron Works.
Dyer Bros., Iron Works.
John Lee Co., sheet-iron works.
Pacific M'fg Co., windmill builders.
Henry M. Black & Co., carriage m'trs.
M. O'Brien, m'tr mill machinery.
J. J. La Chapelle, carriage m'tr.
Murch & Gray, machinists and tool-makers.
Konetchy & Siegl, Ornamental Iron Works.
P. H. Jackson & Co., iron work for buildings.
F. A. Huntington, machinist and foundry.
Steiger & Kerr, iron founders.
W. Swabel, machine shops.
I. L. Burton, machine works.
Charles Klein, carriage maker.
McCormick Bros., Industrial Iron Works.
Western Foundry.
Howard Ebet M'fg Co.
H. D. Morris, steel works.
Betts Spring Co., m'trs steel springs.
J. Hammond, California Car Works.
J. V. Hall, boiler works.
J. R. Jardine, iron works.
G. W. Pennington & Son steel works.
Murray Bros., machine Works.
Charles Rueser & Co., carriage makers.
Richard Nugent, carriage maker.
O'Brien & Son, carriage makers.
W. Wertsch, carriage maker.
A. Folsom & Son Co., carriage makers.
McCue Carriage Co.
Felix Kearns, carriage maker.
J. P. Stead, wagon maker.
G. Mirasky, carriage builder.
Ross & Schraeter, Ornamental Iron Works.
Carvill M'fg Co., carriage makers.
J. J. Klappenwich, carriage maker.
John Heutschler, carriage maker.
Weller & Johnson, carriage makers.
A. W. Lyons, carriage maker.
Murray & Malloney, carriage makers.
T. Roberts, carriage maker.
B. Grave & Co., carriage m'trs.
Thomas Costigan, wagon maker.
David Kerr, wagon maker.
Francis Smith & Co., pipe m'trs.
F. A. Robbins, press works.
I. W. Raymond, gas engine m'tr.
Robert Hall machine works.
C. J. Perian & Co., safe m'tr.
Wm. F. Thompson, machinist.
Western M'fg Co., machine works.
Wm. J. Brady, iron works.
John Finn, metal worker.
American Tool Works.
H. B. Schindler, wagon maker.
W. McAfee & Son, hoiler works.
San Francisco Iron Works.
D. D. Wass, iron fence and wire works.
M. A. Graham, Oriental Gas-Engine Works.

THE Arcata Union referring to the oil wells in the Garberville section of Humboldt county says it is informed by an oil expert that operations on the oil well near Garberville have ceased, and the casing was being removed from the well, after a depth of more than 2,400 feet had been reached. He gave it as his decided opinion that there was no prospect of finding oil in paying quantities on the formation where the well was being sunk, as due consideration had not been given to the geological formation of the location. He is of the opinion, however, that oil may be struck by sinking a well farther south than the present location, and is ready and willing to try the experiment, either at his own expense, or in connection with the company now formed, if the use of the machinery owned by the company can be had.

The Stewart Mining Bill.

Full Text of a Measure Important to Miners.

In the Senate of the United States, Dec. 10, 1891, Mr. Stewart introduced the following bill, which was read twice and referred to the Committee on Mines and Mining:

February 2, 1892, it was reported by Mr. Stewart with amendments, viz.: Omit the parts in SMALL CAPS and insert the parts printed in italics.

A Bill to Amend Chapter Six of Title Thirty-two of the Revised Statutes Relating to Mineral Lands and Mining Resources.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section twenty-three hundred and twenty-four of the Revised Statutes be amended to read:

"SECTION 2324. The miners of each mining district may make regulations, not in conflict with the laws of the United States or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording the amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground by posts or monuments so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim. On each lode claim located after the tenth day of May, eighteen hundred and seventy-two, and until payment of the purchase-money and a certificate of entry has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all lode claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year for each one hundred feet in length along the vein until payment of the purchase-money and a certificate of entry has been issued therefor; and for each twenty acres of placer claims, and for each subdivision thereof less than twenty acres, ten dollars' worth of labor shall be performed or improvements made during each year until payment of the purchase-money and a certificate of entry shall be issued therefor. But where several adjoining lode claims, not exceeding five, are owned or held by the same person, association or corporation, and the sum of five hundred dollars or more is expended in any one year in good faith for the development of all of the claims so owned or held, not exceeding five, there shall be no requirement for separate labor or improvements to be performed or made on the several claims so owned or held during such year. The year within which the annual labor or improvements required to be performed or made by this section shall commence at twelve o'clock meridian on the first day of October of each year; *Provided*, That upon claims located previous to the first day of March in any year the annual labor or improvements shall be performed or made on such claim for that year prior to twelve o'clock meridian on the first day of October next succeeding, and upon claims located after the last day of February and prior to twelve o'clock meridian of the first day of October in any year, the annual labor or improvements required shall be performed or made within one year from twelve o'clock meridian of the first day of the succeeding October: *And provided further*, That only one-half of the annual labor or improvements required by this act shall be necessary to be performed or made prior to twelve o'clock meridian of the first day of October, in the year eighteen hundred and ninety-one, on claims upon which the annual labor or improvements were performed or made in the year eighteen hundred and ninety-one; but after the first day of October, in the year eighteen hundred and ninety-one, the full amount of labor or improvements required by this act shall be performed or made upon such claims as to all other cases during each year prior to twelve o'clock meridian of the first day of October. In case the first day of October falls on Sunday or any holiday, the following secular day shall be construed as the first day of October within the meaning of this act. When the labor required by this act shall have been performed or the improvements made, an affidavit may be filed within thirty days after the time limited for performing such labor or making such improvements with the recorder of deeds of the county in which the claim or mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with the conditions of this act in the performance of labor or making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns or legal representatives do not resume work upon the claim after such failure and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made; but no relocation of a claim by a person who has already located such claim and failed to comply with the conditions of this act to performing work or making improvements shall be valid prior to such resumption and continuance of work upon such claim. Upon the failure of any one of several coowners to contribute his proportion of the expenditures required hereby, the coowners who have performed the labor or made the improvement may, at the expiration of the year, give such delinquent coowner personal notice in writing or notice by publication in the newspaper published nearest the claim for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his coowners who have made the required expenditures. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the recorder of deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such coowners. Where a person or company has or may run a tunnel for the purpose and with the intent to good faith of developing a lode or lodes owned by said person or company, the money so expended in running said tunnel shall be taken and considered as expended on said lode or lodes: *Provided further*, That said lode claim or claims shall be distinctly marked on the surface as provided in this act."

SEC. 2. That section twenty-three hundred and twenty-five of the Revised Statutes be so amended as to read:

"SEC. 2325. A patent for any land claimed and located for valuable deposits may be obtained in the following manner: Any person, association or corporation authorized to locate a claim under this chapter, having claimed and located a piece of land for such purposes, who has, or have, complied with the terms of this chapter, may file in the proper land office an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the United States surveyor-general, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least one person that such plat and notice have been duly posted, and shall also file a copy of the notice in such land office, and shall thereupon be entitled to a patent for the land in the manner following: The register of the land office, upon the filing of such application, plat, field notes, notices and affidavits, shall publish a notice that such application has been made, for the period of sixty days, in a newspaper to be by him designated as published nearest to such claim; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter within the sixty days of publication, shall file with the register a certificate of the United

States surveyor-general that five hundred dollars' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description, to be incorporated in the patent. At the expiration of sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the register and receiver of the proper land office at the expiration of the sixty days' publication it shall be assumed that the applicant is entitled to a patent, and that no adverse claim exists, and upon the payment to the proper officer of five dollars per acre he shall receive a certificate of entry; and thereafter no objection from third parties to the issuance of a patent shall be heard except it be shown that the applicant has failed to comply with the terms of this chapter. But no more than three thousand feet in length along the vein OR on claims located prior to the tenth day of May, eighteen hundred and seventy-two, and not more than the extent of fifteen hundred feet in length by six hundred feet in width located after said date, shall be included in the same application for a patent, and not more than forty acres of placer or petroleum ground or land that is chiefly valuable for building stone shall be included in the same application for a patent: *Provided*, That when fractional claims are located or sought to be patented between other existing claims the end lines may be made to conform to the lines of such adjoining claims."

SEC. 3. That section twenty-three hundred and thirty-four of the Revised Statutes be amended by adding thereto the following:

"And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants."

SEC. 4. That section twenty-three hundred and thirty-five of the Revised Statutes be amended to read:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in any State or Territory of the United States or in the District of Columbia having an official seal, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same, attested by his seal of office, shall have the same force and effect as if taken before the register and receiver of the land office. In cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken, under such regulations and notice as the Commissioner of the General Land Office may prescribe: *Provided*, That the presence of rock in place bearing gold, silver, cinnabar, petroleum, or other valuable METAL mineral, shall be regarded as prima facie evidence that the land containing the same is mineral in character; *And provided further*, That in investigating the character of land with a view to ascertain whether it is more valuable for mineral than agriculture, evidence may be taken of the mineral discovered or developed adjacent to such land."

SEC. 5. That section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where nonmineral land not included in a lode claim is used or occupied, or is intended in good faith to be used or occupied by the proprietor of such vein or lode claim for mining or milling purposes, such nonmineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately, subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such nonmineral land shall exceed ten acres, and payment for same must be made at the same rate as fixed by this chapter for the superficies of the lode claim. The owner of a quartz-mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill-site as provided in this section."

S. 54—2.

SEC. 6. Amend section twenty-three hundred and thirty-eight of the Revised Statutes so as to read:

"SEC. 2338. As a condition of sale each patent shall reserve the right of way through or over any mining claims for roads, ditches, canals, cuts, tunnels and other easements, for the purpose of working OTHER mines and for agricultural purposes: *Provided*, that any damages occasioned thereby shall be assessed and paid in the manner provided by the laws of the State or Territory in which such mine is situated for assessments and payments for land taken for public use under the right of eminent domain. And the rights and easements heretofore reserved under the provisions of this section (twenty-three hundred and thirty-eight of the Revised Statutes) in patents heretofore issued shall be regulated and made available as heretofore prescribed."

SEC. 7. That town-site entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by such towns or cities to any vein of gold, silver, cinnabar, copper, or lead, or to any valid mining claim or possession held under existing law. When mineral claims are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title to town lots shall be subject to such recognized possession and the necessary use thereof, and when entry has been made or patent issued for such town-sites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein and surface ground recognized by the local laws and statutes of the United States not held or possessed adversely to the claimant for such mineral vein by other than the said city or town, or when it shall appear that the claimant otherwise entitled to such mineral vein has acquired title to such surface ground from the said city and town: *Provided*, That no entry shall be made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant."

COLLIERY DISASTERS.—An English paper states that although the year 1892 cannot be said to have been an improvement on the preceding one with respect to colliery explosions of a fatal character, it contrasts favorably with that of 1890, when 290 persons were killed. The fatalities in 1891 reached only 58, whilst in 1892 they amount to 126. The year's record is largely made up of the victims who perished at the Park Slip colliery in August last, when about 116 men perished, leaving 58 widows, 152 orphans, and 12 dependent relatives on an insufficient fund. With one exception, when two persons perished, the rest were single fatalities. It may be stated that since 1866, which was the worst fatal year on record, the number of lives lost by explosions have decreased. In the year named, 364 lives were lost at the Oaks colliery, near Barnsley, which swelled the grim record. The lowest year was 1884, when only 51 persons lost their lives by explosions in collieries.

It is generally supposed that no miller or any one connected with a flour-mill would ship flour in a car whose floor or sides were saturated with kerosene oil, but they do it frequently. The same person does not often repeat the action, but most every one shipping flour has to stand the expense of this experiment at least once. A Toronto baker recently had an expensive experience with flour that had absorbed enough of the odor of oil in transit to spoil it. The flour seemed to be all right, but the oven smelled strongly of oil when the first batch of bread was being baked. The bread was sold, but not eaten, and the flour was paid for by the shipper. Flour absorbs odors very

readily, and should not be placed in a small, musty room or near oil, onions or rotten produce of any kind.—Miller.

Ancient Gravels of Siskiyou County.

SAN FRANCISCO, Feb. 3, 1893.

TO THE EDITOR:—The "ancient blue channel" that extends through Siskiyou county from north to south, until obscured beneath the lava flows of Mt. Shasta is not unlike, in geological age and character of gravel, the "great blue lead of the Sierras."

This ancient river, in the writer's judgment, belongs to the Pliocene epoch, as is distinctly manifest by the fossil flora and fauna found in its deposits. Our leading geologists have, after scientific research, established the plausible theory that the age of these prehistoric streams belong to the Pliocene epoch of the Tertiary period. The time of their flowing activity has been so remote, however, that geologists can but establish reasonable theories and not positive facts.

The existence of this ancient stream in Siskiyou was not discovered until recently, owing no doubt to its submerged condition and the presence of an overlying stratum of sandstone. In the Cottonwood district, near the town of Henley, the channel has been exploited to some extent and the gravel found to be auriferous. Near Yreka a limited amount of development has been done upon it by means of shafts, but owing to the hard, cemented character of the gravel which necessitated heavy expenditures, the work was temporarily discontinued.

The geological features that distinguish the "great blue" of the Sierras in the various character of its stratum materials, namely, the heavy overlying cappings of volcanic ashes and basalt, are mostly absent from the channels of Siskiyou.

In the central mining counties the presence of these deep lava flows, some of which reach to a depth of nearly one thousand feet, makes it extremely difficult to exploit for the channels. The absence of the volcanic capping in this county, and in most sections the uncemented character of the bottom gravel, admit of a comparatively light expense in the exploitation and operation of the deposits.

There are in the county two distinct ancient river systems—first, the blue lead of the Pliocene period above referred to; the other a red gravel channel which extends in a northwesterly direction toward the present flowing Klamath river.

This latter lead is unlike the "ancient blue" both in character of channel-filling and topographical environments. On account of the absence of fossiliferous remains and other Tertiary evidences, there is reason to believe that its depositions occurred during a comparatively recent period. The primitive and natural configuration of the region through which the channel extends has, from recent geological causes, namely, by aqueous and dynamical forces, been decidedly changed. Heavy mountain displacements, torrential, transversing streams and glacial flows, have in many places so effectively disfigured the channel that it requires the most diligent research to correctly locate its original course.

These geological disturbances are confined principally to a section of the channel about 12 miles in length in the granitic formation between the headwaters of Scott river (near the south end and apparent source of this ancient stream) and Mill creek, near the town of Etna. Northwesterly from Etna the geological structure of the mountains changes to a metamorphic slate formation of a less disturbed condition. The channel extends along northwesterly, skirting the western side of Scott and Quartz valleys, hugging closely the base of the Salmon mountains, which rise abruptly upward to an altitude of 8000 feet.

It is followed with little difficulty for a distance of 20 miles, to where Scott river (a modern stream) has crossed and recrossed it to such an extent that it is almost entirely swept away and its auriferous deposit distributed along the bed of the present river.

The character of the "channel material" is a red colored auriferous gravel, consisting of a variety of boulders, pebbles, and sand eroded from the granite, syenite, serpentine, schists and slate formations. The sources of this "ancient river" occurred far up in the Scott mountain range. The supplying agencies from which it derived its origin were the higher ancient channels of Fox creek and the south fork of Scott river, both famous as rich gold-bearing streams.

Considerable adverse opinion prevails regarding its origin, many maintaining that it is a continuation of some ancient river having its sources in Trinity county. The practicability of the latter theory is an absolute impossibility. The topographical features of the mountain range that divides the two counties are such that at no period could any extinct or existing stream drain from Trinity to Siskiyou.

I am emphatically assured by personal investigations thoroughly made that its sources occurred no farther south than the south fork of Scott river.

In Quartz valley, at the "New Pinnery," a Stockton company is energetically operating a portion of the channel with remunerative results. At the "Old Pinnery," adjoining the New Pinnery, is situated the Deming property. Operations are conducted at this mine under the hydraulic process. The working seasons are comparatively short and the water supply limited. Notwithstanding this fact, the property yields annually very handsome returns.

At the extreme north end of the channel at Scott river is located the Red Point mines, the property of a San Francisco company. They are at present engaged in making preparations to develop the channel upon an extensive scale. This property consists of about 160 acres. Some prospecting work has already been done by the company and very rich gravel encountered.

The "breaks" or "overflows" deposited from the channel upon the flats along its course have been profitably worked in early days and give strong evidence that the bed of the ancient stream is highly auriferous.

FRANK HENRY HALL.

Educated Engineers and Amateur Experts.

TO THE EDITOR:—I had no idea that I was going to bring down on my devoted head such crushing rejoinders as those of your correspondents "Morton" and "Amador," as a consequence of an expression of my views on the subject of exaggerated mining reports, and the employment of amateur experts instead of educated engineers.

The burden of the two articles referred to is, that the educated engineer is at best a humbug, and a chronic blunderer, and instances are quoted as examples of their mistakes, in support of the argument.

I did not claim in my remarks that they were infallible, but simply that, being educated to the business, they ought to be more competent than the ordinary miner, who gains his knowledge and experience from swinging the pick, something the educated mining engineer has presumably had some practical experience in as well, as a part of his education. But be that as it may, I would like to hear from Morton, also Amador, as to the fact whether the practical man, that he holds up as superior to the scientific engineer, is always correct in his judgment on a mine, and whether he is not prone to make mistakes as often as the other man? Is he always correct?

If I had signed my article "Experience," instead of "Mining Sharp," it would have been more appropriate, as what I know about mines has been more the result of dealing in them than practical experience, and I make no claim to be competent to expert a mine. But I have been connected with mines from the opening of the Comstock, as owner, promoter, capitalist, superintendent, director, president and vender, at home and abroad—in fact, everything above ground that pertains to mines, and mining as a business—for 30 years, in the course of which period I have seen a good many things that have assisted me in forming my opinions of the practical and the scientific mining expert.

At one time I became imbued with the popular idea that the scientific man was a humbug, and I switched off to the practical underground toiler with a pick. My experience was not a happy one, and after spending more money in gaining it than I care to admit, I came to the conclusion that, while the miner often had most excellent judgment on the work immediately under his eye, it was of very little value beyond. I have never underrated the judgment of the practical miner in his particular line, but, as I say, my experience is, that something more is necessary than such superficial knowledge, and it is the business of the educated engineer to supply that want, and one that cannot be not the sort of a man that should set himself up as an expert.

It is a favorite theme to quote such men as Mackay, Head, Fair and Hearst as men who, from practical experience, seldom failed in their judgment of a mine. I happen to know that nearly all of them have made mistakes, and have had their losses like the rest of us, and, moreover, the most they know about mines has been gained quite as much since either of them has swung a pick as they ever knew before, and this has been gained by chewing the string of the pudding.

Senator Hearst and myself were closely associated in mining business in early days, and he often, when we were considering the question of the examination of a property and I urged that he should make the experting himself, was wont to say, "If it was all my own money that was at stake I would not mind, but I had rather pay my share and get a competent man." I would say, "You are a practical miner, and should be perfectly competent." His reply was, on one occasion, I remember, "There is a d—n sight about this mining business that we fellows don't know." The great secret of his subsequent success was what is really the only method of succeeding, and that is, to have the capital to open and develop promising prospects, and if one in five turns out well, it more than pays for all the others.

There is not probably any set of men that have paid more money to scientific, educated experts than these very men who are practical miners themselves. They are a good deal like doctors, who, when they get sick, having no faith in their own skill and ability, call in another practitioner. I admit that there is a great deal in both Morton's and Amador's arguments worth commendation, very sensible and truthful, but it strikes me they are rather sweeping in their condemnation of scientific engineers and must lament the stupidity and want of intelligence that has not yet discovered that the practical miner and superintendent is the only reliable and competent man to examine a mine, report on it as it is, or should be, and of course they never make mistakes.

I have a few pigeon-holes full of such literature that I get out at times when I want to read romances, and Jules Verne fails to come up to the standard; and as each has a note of how much I paid for it, I figure sometimes the many \$20 pieces they cost. I let my imagination run riot and guess what a big fortune I would have had if the gentlemen who made the reports had shown a little more scientific experience, and a little less of the practical. Some of these reports I have indorsed: "The report of truthful Jeems on the 'Bob-Tailed Nag' mine, with all its dips, spurs and angles, proving on further inspection to have nary a dip; nary a spur; nary an angle."

If a mining expert is to be judged by the mistakes he makes, why not the practical man's work also? If Morton or Amador would like to gather statistics on this question, I think I could come in with an armful of evidence that the practical expert does sometimes put his foot in it.

I do not feel myself competent to argue with either of the gentlemen, who I can't help thinking indulge somewhat in scientific terms and wise conclusions themselves, notwithstanding their professed contempt for anything of that sort; for I, as I explained, am only the man that has paid for the whistle, and am only blowing on it a little just to pass an idle hour. I shall leave it to some real, genuine, "educated" engineer to answer my two friends up country, who, at any rate, should feel under obligations to me for giving them the opportunity for getting their guns on the book-learned fellows, and giving them particular fits, as it

were; and if it is something they have had on their minds for some time, it will be a great relief, doubtless. Even more from the same source would, I do not doubt, be very acceptable to the MINING AND SCIENTIFIC PRESS, which, it is well understood, gives both sides a fair showing. I warn, however, both gentlemen that I shall hand over the fight to a competitor more worthy of their steel. I shall call to my aid one of those scientific sharps; then look out for yourselves, gentlemen.

"MINING SHARP."

The Woods of Washington and Oregon.

Following are the principal woods found in the different counties of Washington, from returns made to the *Lumberman*:

Asotin—Pine, fir, tamarack, alder.
Chehalis—Fir, spruce, cedar, Alaska pine, alder, maple, ash, larch.
Clallam—Fir, spruce, cedar, Alaska pine, alder, maple, ash, yew, Alaska cedar, oak.
Clarke—Fir, spruce, cedar, Alaska pine, larch.
Columbia—Pine, fir, alder, tamarack.
Cowlitz—Fir, cedar, Alaska pine, ash, maple, alder, larch, oak.
Douglas—Pine, fir, tamarack.
Garfield—Pine, fir, tamarack, alder.
Island—Fir, cedar, spruce, Alaska pine, maple, alder, cottonwood, ash, yew, oak.
Jefferson—Fir, cedar, spruce, Alaska pine, maple, alder, cottonwood, ash, yew, Alaska cedar.
King—Fir, cedar, Alaska pine, spruce, cottonwood, maple, alder, Alaska cedar, larch.
Kitsap—Fir, cedar, Alaska pine, spruce, alder, maple.
Kittitas—Fir, pine, cedar, larch, Alaska cedar.
Klickitat—Fir, pine, cedar.
Lewis—Fir, cedar, Alaska pine, ash, maple, oak, alder, larch, willow.
Lincoln—Pine, fir, tamarack.
Mason—Fir, cedar, Alaska pine, spruce, maple, alder, ash, cottonwood.
Okanogan—Fir, pine, tamarack, larch, Alaska cedar.
Pacific—Fir, Alaska pine, spruce, cedar, maple, alder, cottonwood, ash.
Pierce—Fir, cedar, Alaska pine, spruce, alder, cottonwood, ash, maple, Alaska cedar, larch.
San Juan—Fir, cedar, spruce, alder, maple, oak, yew.
Skagit—Fir, cedar, spruce, Alaska pine, white pine, larch, maple, alder.
Skamania—Fir, larch, pine, cedar.
Snohomish—Fir, cedar, Alaska pine, spruce, cottonwood, alder, maple, larch.
Spokane—Fir, pine, cedar, spruce, tamarack.
Stevens—Pine, fir, tamarack, spruce, cedar.
Thurston—Fir, cedar, Alaska pine, spruce, maple, alder, ash, cottonwood.
Wahkiakum—Fir, spruce, cedar, Alaska pine, larch, maple, alder.
Walla Walla—Pine, fir, alder, tamarack.
Whatcom—Fir, spruce, cedar, Alaska pine, maple, alder, larch.
Whitman—Pine, fir, cedar, spruce.
Yakima—Fir, pine, cedar.

It will be noticed that some of the woods mentioned as existing in the State are not given in the list by counties. The reason for this is that these woods are not found in very large quantities in any one place, but are scattered among other timber, some throughout several counties and others only in rather remote places. The woods mentioned in the county list comprise about all that are found in the State in large bodies.

Following are the principal woods growing in the counties of Oregon:

Baker—Pine, fir, tamarack, juniper.
Benton—Fir, pine, spruce, cedar, Alaska pine.
Crook—Fir, bull pine, cedar, sugar pine, yellow pine, juniper, mountain mahogany.
Clatsop—Fir, cedar, spruce, Alaska pine, cottonwood.
Columbia—Fir, spruce, cedar, oak, alder, maple.
Clackamas—Yellow fir, cedar, larch, pine, Alaska pine, ash.
Coos—Fir, spruce, white cedar, Alaska pine, maple, myrtle, ash, red cedar, oak.
Curry—Fir, yellow pine, sugar pine, oak, white cedar, red cedar, Alaska pine, spruce, maple, myrtle, ash.
Douglas—Fir, spruce, Alaska pine, red cedar, white cedar, oak, sugar pine, yellow pine, maple, myrtle, ash, cottonwood, alder.
Gilliam—Pine, fir, tamarack.
Grant—Yellow pine, fir, tamarack, bull pine.
Harvey—Bull pine, fir, tamarack, yellow pine.
Jackson—Yellow pine, bull pine, sugar pine, yellow fir, red fir, white fir, red cedar.
Josephine—Sugar pine, yellow pine, fir, spruce, Alaska pine, red cedar, white cedar, oak, cottonwood, myrtle, ash.
Lave—Red fir, yellow fir, red cedar, white cedar, Alaska pine, yew, maple, alder, balm, larch.
Linn—Fir, Alaska pine, cedar, larch, yew, alder, maple.
Malheur—Yellow pine, bull pine, fir, tamarack.
Marion—Fir, cedar, pine, Alaska pine, larch, oak.
Morrow—Yellow pine, fir, tamarack.
Multnomah—Fir, cedar, spruce, pine, Alaska pine, larch, alder, maple.
Polk—Fir, pine, spruce, cedar, Alaska pine, larch, oak.
Sherman—Fir, pine, tamarack.
Tillamook—Fir, spruce, pine, cedar, Alaska pine.
Umatilla—Pine, fir, tamarack.
Union—Yellow pine, bull pine, fir, tamarack.
Wallowa—Pine, fir, tamarack.
Wasco—Yellow pine, sugar pine, bull pine, fir, cedar, tamarack, juniper, mountain mahogany.
Washington—Fir, cedar, pine, Alaska pine, larch, oak, ash.
Yamhill—Fir, cedar, pine, Alaska pine, maple, alder, larch.

Notes on Palms.

Nothing in the whole range of vegetation so impresses the traveler from less-favored climes than the presence of lofty palms. At the residence of Mr. Kinton Stevens, of Montecito, Santa Barbara county, can be seen a pair of *Cocos plumosa* over 20 feet high, with well-defined trunk, less than 11 years old. In the same gardens can be seen thrifty specimens of *Seaforthia elegans* and *Jubaea spectabilis*, the "Coquito," or little coconut of Chili, the latter a very hardy palm; besides these, a good collection of fan-leaved palms, including "Sabal palmetto," of Florida. At the residence of Mr. Sheffield in Santa Barbara, can be seen a fine *Seaforthia*, which has already produced fertile seeds. In many other Santa Barbara gardens, smaller specimens of *Seaforthia* are growing, showing the appreciation of the Santa Barbara people for fine plants.

In Los Angeles the list is much smaller. At the home of Mr. E. Germain flourishes a thrifty plant of *Kentia Forsteriana*. This plant has been in the open three winters and is a model of health and beauty. Few species can surpass *Kentia Forsteriana*; it ultimately attains a height of 40 feet; indigenous in Lord Howes island. At Mr. H. Jevne's place a smaller example of the same species seems well established. Near Rosedale cemetery, in a private garden, a nice young specimen of *Cocos plumosa* occurs; out several seasons. At Mr. Forester's place, on Seventh street, and at Mr. Decler's place, on Sand street, are also good plants of *Seaforthia elegans*, out several years in the open ground; while at Coronado Beach, beautiful plants of *Areca Bauerii*, *Kentia Forsteriana*, *Seaforthia elegans* and *Cocos plumosa* can be seen.

There yet remains a number of good palms to be introduced to open-air cultivation, notably the following: *Kentia Belmoreana*, *K. Cantherburyana*, *K. Sapida*, *Areca Bauerii*, *Cocos flexuosa*, *C. Australis*, *C. coronata*, *C. Yalae* and *C. Romanzoffiana*, *Ceroxylon andicola*, *Caryota Urens* and *Ptychosperma Alexandria*, all of varying degrees of hardiness. At some particularly sheltered and warm places along the foothills, it is not improbable that *Oreodoxa regia* would flourish. The writer noted the experiment of a plant of this species tried in this city, which endured two winters, but the heavy soil during the third winter, owing to unusually heavy rains, became so cold and water-logged that the roots decayed and the plant perished. These considerations should always weigh in the attempt to cultivate new species of doubtful hardiness. Many a tropical plant will flourish and endure slight frost if not too frequent, if the soil be comparatively light and well-drained; while in a quite frostless location, heavy soil may become so charged with moisture that decay of the roots takes place, and the plant either languishes or dies outright.

It is not intended that the foregoing remarks are more than a glance at the possibilities of new introductions. We know comparatively little of the Andean palms of Bolivia, or the remoter Alpine regions of Venezuela, while Paraguay is almost a botanical terra incognita. Count Castelman, during his great Brazilian expedition, records having seen many palms on the confines of Paraguay, few of which anything is known. Spruce, in his valuable essay on the palms of the Amazons, alludes to several genera and species as occurring at considerable altitudes. *Iriartea ventricosa* and *I. exorrhiza* ascend the Andes to 5000 feet. According to Humboldt, *Ceroxylon andicola*, the famous wax palm of Columbia, was found growing to the Cordilleras, near the pass of Quindiu, between Ibague and Cartago, at from 7900 to 10,000 feet, in company with *Podocarpus* trees and *Quercus Granatensis*, not very far from the snow line.

From the temperate mountain regions of sub-tropical Mexico are known, among others, *Chamaedorea colorata* and *Copernicia pumosa* (the latter a fan-leaved palm), at elevations of from 7000 to 8000 feet. In the garden of the writer, *Chamaedorea Desmonoides* seems quite hardy. Some of the Mexican *Acrocomias* and *Astrocaryums* (splendid spinescent palms) would undoubtedly flourish in favorable places here. In Ceylon, *Oncosperma fasciculatum*, a slender-stemmed, prickly palm, of great elegance, occurs as high as 5000 feet, while *Copernicia cerifera*, the Brazilian wax palm, extends into Argentina, and would likely flourish here. Enough has been said, however, to indicate in some degree the possibility of adding many fine palms to cultivation here.

It should not be inferred that the fan-leaved section of palms is much less beautiful in all species than those of the former group. Indeed, a few species rival and some excel the pinnate palms in magnificence, and no paper would be in any degree complete without reference to them. Commencing with *Washingtonia filifera*, which is abundantly represented, we have, in lesser numbers, *Chamaerops excelsa* and *C. humilis*, picturesque, but stiff and ungraceful palms. Not quite so common is *Corypha Australis*, a fine Australian palm. Still rarer is *Lantania Borbonica*, a fine-fruited specimen of which can be seen at Mr. Hancock Johnson's place in East Los Angeles. There are two other fine palms rarely seen, and yet their native habitat is less than 400 miles distant. *Erythea edulis*, from Guadalupe island, off the coast of Lower California, and *E. armata*, occurring in deep canyons just below the State line in Lower California. They are both quite hardy and make splendid plants as they attain size. The former has rich, dark green leaves, much darker than *Washingtonia*, and without the filaments so characteristic of this species, while the foliage of *E. armata* is an ashy blue, and one of the most distinct of palms.

It is proper to say, in closing this article, that due consideration should be given to location, character of soil, known liability of biting frosts, or general exemption, and of equal importance in the planting of species of doubtful hardiness is the selection of good, strong plants, pot or box-grown, and planting should be done not much earlier than April, nor delayed much beyond May. A long summer is thus assured, during which the subject may become well established.—J. C. Harvey in Rural Californian.

Mechanical Progress.

Saving by Firing with Oil on Steamers.

An English inventor claims, says the *American Manufacturer*, that, with his system, he does with one ton of oil that which three tons of best coal are required, which means a great saving of space. Taking the average price of coal on "all-around" at 25s per ton, and oil-fuel at 50s per ton, the following comparison is obtained:

COAL.	
Coal (600 tons at 25s per ton).....	£750
Stokers (say 9).....	168
	£918
OIL-FUEL.	
Oil-fuel (200 tons at 50s).....	£500
Oilmen (3).....	56
	£556
Gain by using oil-fuel:	
Less cost of fuel and stokers.....	£382
Cargo (ex-coal space) 270 tons at 40s.....	540
	£922

So that, if as at present with coal-fuel, a steamer should only just pay its expenses, by the use of oil-fuel a considerable profit would occur, in addition to other advantages.

In a steamer specially designed for oil-fuel, the double bottom may be used as "bunkers" for the oil-fuel, thus allowing the space usually set apart for carrying coal to be used for carrying freight, and so augmenting the carrying capacity of the steamer.

Where oil-fuel is used, stokers practically are not required, because there is no stoking, fire-cleaning or coal-trimming required, and a few men would replace any army of stokers.

After the fires in the boiler with oil-fuel are started, the doors of the furnace are never opened, so that there is no loss of heat, as is the case with coal by frequent opening of the doors for stoking and cleaning of the fires, when the cold air is unlimitedly admitted, prejudicial also to the endurance of the boilers from rapid expansion and contraction.

An experiment recently was made on a steam-yacht in France, where residuum was used as a fuel. During the travel one man was able with ease to run the engine and care for the fires. A little more than one-half the amount of fuel was consumed which would be used if coal had been the fuel. The trial proved that the relative movement of oil and coal required for the same work was as 4 to 7.

Other and more important experiments were made at Cherbourg and Toulon, extending over a period of several months.

The trials are reported to have shown that, by using coal in the customary way, with natural draft, and supplementing it with petroleum in the proportion of about 15 or 20 per cent of the total weight of both kinds of fuel burned, the boiler-power can be increased by about 20 to 22 per cent, taking as a standard the performance of the boiler when using coal alone with clean fires and with natural draft. This proportion of petroleum gave the best results obtained, from the standpoint of economy.

In the case of a vessel having only a moderate forced-draft power, it was found that, increasing considerably the proportion of petroleum burned, the highest power obtainable was practically the same as could be developed with forced draft when using coal alone. While using petroleum no special means were employed to give a stronger current of air than usual.

But as the definite result of the tests made, the conclusion was reached that vessels having closed fire-rooms and thoroughly efficient forced-draft appliances can develop a much higher power by burning coal alone, with forced draft, than by using any of the methods which formed the subject of experiment.

At the same time the trials are regarded as having demonstrated the value of petroleum for use as an auxiliary fuel in connection with coal. The mixed fuel, as it has been termed, would enable boilers to respond promptly to sudden demand for an increased amount of steam and would afford a means of keeping up a relatively high speed for several days without resorting to the use of forced draft and without subjecting the fire-room force to any undue strain.

Big Locomotives for Mexico.

The biggest and most powerful railroad locomotive in the world, according to *Locomotive Engineering*, will soon be running on the Mexican railroad. It was constructed at the Rhode Island Locomotive Works, with a couple of like companions. The monster weighs 130 tons when in working order, and was built to climb steep grades in the mountains of Mexico and to drag heavy loads around sharp curves safely. The engine looks like a couple of loco-

motives of the "mogul" pattern backed up together, with the two cabs joined. It is an odd form and was constructed after a design by superintendent of machinery F. W. Johnstone, of the Mexican Central, who realized that a special style was necessary for the work to be performed on his railroad. The idea was to secure a motor with flexibility sufficient to go round the sharp curves with least frictional resistance. This flexibility is gained by securing the driving-wheels in a truck which is free to move in a line different from that followed by the main frames.

The cylinder and boiler in the Mexican Central Goliath are carried on the main frames separate from the driving-wheel trucks. As the cylinders are not in line with the driving-wheels in rounding curves, it is necessary that a special method of transmitting power from the cylinders to the crank-pins should be employed. This is done in a very ingenious way through levers that transmit the power, and compensate for the varying distances between the pistons and the crank, due to the swiveling of the driving-wheels. But for this compensating arrangement it would be necessary to give the engine so much cylinder appearance that the loss of steam would be very great. The power-transmitting levers are seen at the back of the cylinders, connected at the top by a short link, and the bottom ends pinned to the front end of the main rods. There are two of the latter, one connecting with a crank-pin, the other with a return crank. The piston transmits motion to the back one of the two levers, and that gives motion to the front lever, which is fulcrumed securely to the frame near its center.

The engines are compound, with annular cylinders, the high-pressure cylinder being in the middle and the low pressure cylinder outside. The high-pressure cylinder is 13 inches diameter and the low-pressure 28 inches. The stroke is 24 inches. It is calculated that the cylinder capacity of each pair of cylinders is equal to a 19x24 simple engine.

The boilers are of Otis steel, 9-16-inch in diameter, and carrying 180 pounds of steam to the square inch. They are 54½ inches in diameter, and have 201 two-inch tubes, 15 feet 9¼ inches long. The fireboxes are of the Belpaire type, 56 inches long and 56 inches wide.

The arrangement of working is that the valve-motion of the two engines is operated by one screw reverse lever.

In the new locomotive the engineer sets on one side of the cab with all the necessary apparatus for working the double-ender within easy reach. On the other side the fireman pours in the fuel through side doors. A coal-passer is necessary to aid him.

SELF-HARDENING STEEL.—There is little doubt but that there is considerable misunderstanding among machinists regarding the use of self-hardening steel. It is quite common to resort to this steel where the ordinary carbon steel used in the shop does not stand well, or refuses to cut; then if the self-hardening steel does not work it is considered that every resource has been exhausted. The fact is, however, that while it is true that self-hardening steel will often do good work where the ordinary steel fails, or is unsatisfactory, carbon steel of high grade and high carbon can be and is made and hardened in the usual way, that will readily cut metals that no self-hardening steel can make an impression upon. It is said a number of coarse files or rasps have been piled upon each other to a height of 12 inches, bound together with wire and drilled through from top to bottom of the pile without lubricant. This was not done by a drill made of self-hardening steel, nor of such common steel as is too often supplied by purchasing agents who give far more attention to discounts and commissions than to quality of the steel they buy, but by high-grade carbon steel made especially for use in such a test. Mushet or self-hardening steel is all right in its place, but there are places for which it is not adapted, and it is best, both for makers and users, that the proper place and uses of the different kinds of steel should be understood.—*American Machinist*.

COST OF NAVAL VESSELS.—The awarding of the contracts for building the new warships "Brooklyn" and "Iowa," to Messrs. Wm Cramp & Sons, for \$2,986,000 and \$3,010,000, causes Secretary of the Navy Tracy to remark on the late reduction of price for this class of work. The prices here quoted are from 10 to 12 per cent less than for any previous ship of their class. The "Brooklyn" will be larger by 1,036 tons than the "New York," and the cost will practically be the same for both. This reduction is due to the sharp competition of at least four well equipped ship-building firms, the Bath Iron

Works, of Bath, Me.; Wm. Cramp & Sons, of Philadelphia; the Newport News Ship-building Co., of Newport News, Va., and the Union Iron Works, of San Francisco.—*Engineering News*.

Scientific Progress.

Hunicke's Process for Smelting Silver Lead Ores Containing Zinc.

The problem of finding an economical process for smelting zinc-bearing silver lead ores in which the galena and zinc blende are intimately mixed is attracting a good deal of attention among metallurgists at the present time. This process recently devised by Mr. H. A. Hunicke will, therefore, be of considerable interest to our readers, although time has not yet been allowed for proving its final commercial value.

The process consists in heating up separately the roasted ore and the coke to about the temperature at which zinc oxide is reduced to metallic zinc by carbonic oxide, and then charging thin layers of each alternately into a cupola furnace. The lead is reduced to the metallic state and runs, together with the silver, to the bottom of the furnace. The zinc is reduced to the metallic state and volatilized, and after escaping from the heated mass is rapidly oxidized again by the gases. The vapor thus formed is led to a condensing chamber, where it is deposited as zinc oxide powder. The reduction of the lead and zinc is effected almost immediately after the introduction of the ore into the cupola furnace, owing to the smallness of each charge, and also to the fact that the ores have been previously heated to the temperature at which the zinc ore is reduced by carbonic oxide. Thus the zinc vapors have no opportunity to clog up the coke and prevent further combustion.

This process differs from the usual one in the previous heating of the ore and fuel, and in the smallness of each charge. Apart from more ready freeing of the zinc and prevention of clogging, the chemical process is the same all through, and the chemical losses of lead and silver are practically the same. There will, however, be more heat expended in heating the two separately and charging them hot, and more labor will be necessary in charging them often and in small quantities. If the ores are brought to the cupola furnace direct from the roasting furnace, some expenditure of heat would be saved, but there would be considerable difficulty in making the output of the two furnaces correspond.

The condensation of the zinc oxide can be carried out to as great a stage of perfection as is commercially profitable. Mr. Hunicke estimates that it is quite feasible to obtain 60 per cent of the metallic zinc when ores containing 16 per cent are worked with.

An objection which may be urged against the process is that it requires a constant uniformity in the chemical composition of the ores. So far no such difficulty has arisen in actual practice, as all ores can be treated satisfactorily. On whatever ores Mr. Hunicke has worked good results have been obtained, and an extra \$5 or \$10 per ton of ore has been realized by the recovered zinc oxide. No doubt the process will have to be adapted to each separate ore on which it is employed, but there is little doubt of its applicability, for it attains an end hitherto unattained—the separation of zinc without fouling the coke.—*Engineering and Mining Journal*.

New Process for Making Gas.

After years of hard study and experimenting, L. C. Parker, of Liberty, Ind., has discovered a process for the manufacture of gas that is attracting the attention of men interested in the gas question all over the country. The gas is essentially an oil water-gas, steam being decomposed, and the results, hydrogen and oxygen, are then carbureted with crude petroleum, passing through a mass of fret-work of firebrick, which, heated to a high temperature, is made into a fixed, noncondensable gas. The process is remarkably simple and easily operated.

In September, says the *Chicago Journal of Commerce*, Mr. Parker began the construction of his test plant, which was completed ready for operation the first of December. Since then the gas has been tested under the most trying circumstances. The results have been most satisfactory. The mains were laid in frozen ground and are lying in the trenches exposed to the coldest weather experienced there for years, the thermometer ranging from 10 to 22 degrees below zero. The gas has resisted all forces which so easily congeal other gases. This is thought to prove that

the Parker Gas is noncondensable. The gas is being used for cooking, heating and illuminating purposes, and shows a heating energy equal to natural gas, there being over 800 heat units per cubic foot. When used for illuminating purposes it gives a diffusive, brilliant light, emitting no smoke or smell, and when tested shows from 22 to 26-candle power. From each 100 barrels of crude petroleum used, from five to seven barrels of the best grade tar asphalt are obtained, which has a market value of from \$4 to \$5 per barrel, and it only requires seven to eight gallons of oil to produce 1000 cubic feet of gas. The asphalt is easily extracted from the boiler where it accumulates. The heating power of the gas is so intense that a small radiator, that is only three feet long by three feet high, keeps the temperature in four large rooms up to 75 degrees when the mercury is below zero. Gas men are coming from everywhere, and all who have investigated and have witnessed its testing pronounce the process a wonder.

Testing Oxygen.

The following simple method of ascertaining the quantity of free oxygen present in mixed gases was described some time ago in *Siftings*. Collect some of the gas in a test tube or in a graduated eudiometer inserted in a basin of water. Bring the water within to the same level as that without, and then hold the tube steady while inserting an accurately-fitting rubber stopper. After noting the volume now occupied by the gas withdraw the stopper (while the open end of the tube is under water of course) and introduce a piece of caustic potash into the tube. Cork it up again immediately, and shake for a few minutes or until the caustic soda is completely dissolved. Then remove the stopper to permit readjustment of the water level. Any contraction that has taken place is due to absorption of carbonic acid. Next wrap a few grains of pyrogallol acid tightly in a single fold of paper, and introduce this similarly to the caustic potash, and so quickly as to prevent the escape of any considerable proportion of that substance. The absorption now observed, which is accompanied by blackening of the potassium pyrogallate solution, represents the amount of free oxygen in the gas under examination, with sufficient accuracy for many commercial purposes. In testing nominally pure oxygen, it would be better that the measurement of the gas should be taken while holding the tube by its immersed end, and while the hydrostatic pressure is equal within and without the tube. Besides, the reading for carbonic acid, which is anyhow pretty rough, owing to the solubility of that gas in water, may be omitted. If pills containing pyrogallol acid within an impervious but soluble coating were made they might probably prove a saleable article to intelligent purchasers of compressed oxygen.

The Action of Alkalies on Glass.

The following facts concerning the action of solutions of alkalies and acids upon glass have been collected from the results obtained by F. Foerster and others who have experimented in this direction, and are published in the *Chemical Trade Journal*:

1. Solutions of caustic alkalies act upon glass much more strongly than water, since, except in very dilute solution, they dissolve all the constituents of the glass as such.
2. Of the caustic alkalies the most active is caustic soda, then follows caustic potash, and then ammonia and baryta water.
3. Rise of temperature increases the action of the alkalies very considerably.
4. The action of the alkaline solution increases with the concentration, at first rapidly, but afterward only very slowly.
5. Highly concentrated solutions at the ordinary temperature have less action than more dilute ones.
6. Pure alkaline solutions, not too highly concentrated, have less action upon glasses than such as have been rendered impure by small amounts of silicic acid.
7. Alkaline carbonates, even in very dilute solutions, attack glass much more strongly than water. Their mode of action corresponds rather with that of other salts than with that of the caustic alkalies. In equivalent concentration solutions of sodium act more powerfully than those of potassium carbonate.
8. The action of salt solutions upon glass is made up in a manner which varies with the concentration and the kind of salt, of the action of the water itself, and that of the salt which is present.
9. Both these modes of attack are differently influenced by composition of the glass.
10. These salts act more strongly than water whose acids form insoluble lime salts. The action of these increases with concentration.

Electricity.

An Electric Torpedo Detector.

An important demonstration has just been made in England, says the *Electrical Review*, of the possibilities of an ingenious electrical and telephonic apparatus for defending roadsteads, anchorages and mine fields by giving warning by visible and audible signals on shore of the approach at night or during thick weather of torpedo boats or other hostile vessels. The experiments in connection with the invention, which is credited to an American, Captain McEvoy, the torpedo and submarine expert, formerly attached to the Confederate army, have extended over several weeks, and have been supervised by a representative of the War Department and a committee of the royal engineers. The instrument employed is called a "hydrophone," and consists of two parts. One part is placed at the bottom of the water, outside the anchorage or mine field, at a depth of from five to fifteen fathoms, and the other is fixed at a station on shore, and the two are electrically connected by cable at distances of from one to five miles. In the demonstration referred to, the instrument was sunk in seven fathoms and about 300 yards from the shore.

The submerged part consists of a bell-shaped iron case, three-fourths of an inch thick, 20 inches in height and extreme diameter, and weighing about 340 pounds. At the top is fitted a sensitive vibrator or diaphragm enclosed in a copper box. It is formed of a plate of ebonite with carbon attachments, and when the case is submerged the delicate mechanism is kept clear of the water by means of the column of compressed air, which is enclosed, as in a diving-bell. As a torpedo boat approaches within a radius of half a mile, or a man-of-war within a mile, the pulsations of the propeller produce a vibratory motion inside the case. These vibrations are transmitted to the station on shore in the following manner: The electric current from the land battery passes through the vibrating mechanism, and also through the apparatus on shore, in the circuit of which is placed an instrument called a kinesiograph, which is somewhat of the nature of a galvanometer.

By means of this the movements in the water are communicated to a needle flickering in a graduated arc, and when the oscillations become pronounced the needle is clutched by a magnet at the end of the arc. This makes contact, and the vibrations in the submerged case are made visible and audible by means of flashing light, the firing of a gun and the ringing of a bell. Telephonic signals are also transmitted through the same current. For coast defenses a number of hydrophones could be sunk in the approaches to a port or dockyard, and warning would thus be given to the neighborhood of an enemy; but, besides this, it is proposed to make the hydrophone useful in dangerous zones, around headlands that are frequently fatal to shipping in dense fogs. A danger zone could be connected by means of the hydrophone with the nearest coast-guard station; and a ship would be warned of the danger into which it was running by the automatic firing of a gun or the flashing of a light.

Pruyn Elevated Electrical Railway.

Various systems of rapid transit, in which only one rail was to be used, have been proposed from time to time, but no practical system seems to have been evolved, although experimental roads have been constructed and operated for a short period. Mr. Henry S. Pruyne, of Hoosick Falls, N. Y., has devised a system which he claims overcomes all the difficulties which have hitherto been encountered, and which renders entirely practical this very interesting form of construction. Mr. Pruyne is making efforts to have his road constructed on the World's Fair grounds and exhibited in actual operation during the exposition.

The accompanying description from the *Electrical World* will give a clear idea of the elevated structure, the form of the cars and the various details of the system. The track consists of one rail carried on the top of single girders placed at proper intervals. The cars are operated by electricity, which is supplied by the double-trolley system. The conductors are carried under the lower flange of the rail, where they are entirely protected from mechanical injury, as well as from the effects of the weather, and from dust and dirt. There is also space under this flange for the suspension of telephone, telegraph, or electric-light wires, which would not be subject to the annoying effects of induction that would be noticed if only one wire and the ground return were used. The carwheels come up into the center of

the car, and the seats for the passengers are arranged lengthwise of the car, back to back, with sufficient space between them and the sides of the car to allow of the passengers and the motormen easily moving from one end to the other. The passengers enter the cars by doors at the sides, but doors at the end are also provided for the convenience of employees. The carrying-wheels bear the car by the means of heavy pins with spring bearings, upon which the weight of the car rests. The car is of much lighter construction than would be possible in any other form, while at the same time it possesses the necessary strength and rigidity. Thus, not only is the center of gravity very low, but it is even below the surface of the rail, which destroys the tendency of the car to tip from one side to the other, or to leave the track. This form of construction renders a much higher speed possible than would be safe with any ordinary car. The current is taken from the conductors by means of two wheels, which also serve as guide-wheels, and form an additional safeguard against the car leaving the track. Good contact is always secured without undue friction.

One of the advantages claimed for the Pruyne system is, that flange friction is done away with to a large extent, and that on rounding curves there is none of the sliding friction which always takes place in a double-rail road. The motion at high rates of speed is also said to be very much easier than in the ordinary steam railroad, or even in electric roads, as there is none of the swaying or vertical motion.

The structure does not interfere in any way with surface roads, or prevent the land which it crosses from being used for agricultural purposes any more than a row of trees would. No grading, ballasting, draining, fencing, and no culverts, telegraph poles, or small bridges are necessary. The advantage which it possesses over the ordinary elevated structure is, that it does not disfigure the street nearly as much, and does not in the least darken it. The objectionable noise is also avoided to a large extent. On account of its great simplicity this structure can be built at a very small cost, and the expense of keeping it in running order is exceedingly low.

This road, of course, possesses all the advantages which other electric systems claim, so that collisions are impossible and accidents from switches and drawbridges can be avoided. The speed which can be obtained by this form of car could be very high, and consequently the inventor urges it as a very practical system of rapid transit, not only in cities, but for the connection of towns and distant points.

The Naval Search-Light.

Electricity has added an almost incredible percentage to the efficiency of our naval establishment, and the rapidity with which it has been adapted to purposes of warfare, and the completeness of the revolution it seems to be making in methods, are fairly marvelous. The search-light alone almost doubles the capacity of the ordinary ship of war.

When the British bombarded Alexandria, the search-lights on the vessels composing the squadron served not only to make the harbor as light as day on the darkest night, but enabled the admiral to observe the operations of the enemy on shore in the construction of batteries and earthworks, thus placing the Egyptians at a decided disadvantage.

It will enable a vessel to engage the enemy at night to almost as good advantage as during the day. It is useful in chasing a flying enemy and in conducting the management of a fleet. The assistance it gives in reconnoitering a coast will be readily appreciated. Difficult movements, such as entering a tortuous channel by night, passing between the vessels in a crowded harbor, and making a landing when the saving of time is of supreme importance, are all rendered comparatively easy by the search-light.

The search-lights of the British squadron at Gibraltar were the means of saving hundreds of lives when a merchant steamer sank in that harbor a few months ago. An effective search-light will make it almost as difficult for a torpedo boat to reach a warship by night as it is by day. Indeed, so difficult does it render the attempt that it has now been decided that the torpedo vessel and everything belonging to it, even to the faces of the men, must be painted black to avoid discovery.—N. Y. Advertiser.

THE business of raising large horses in Canada for export to street railway companies in the States has nearly disappeared since the introduction of the trolley system.

Useful Information.

Cost of Street Cleaning.

Estimates for cleaning the streets of New York and removing ashes and garbage during 1893 place the total cost at \$2,569,253. The total appropriations for this purpose thus far in 1892 have been \$1,093,355; about \$188,000 having been granted since the annual appropriation was made. The estimates for 1893 are distributed as follows:

Administration office force of 24, and supervisory force of 146, \$293,970; sweeping, 1,575 sweepers, 150 machine and water cart drivers, all at \$600 per year, and sundries, \$1,085,000; carting, 675 drivers at \$600 each, hostlers at \$720, shoeing and feeding 950 horses at \$182.50, and sundries, \$671,815; removal of snow and ice, \$40,000; final disposition by means of tugs and scows, \$322,800; new stock, as horses, carts, harness, etc., \$197,338; rentals and contingencies, \$58,330. The salary list varies from \$6,000 for the commissioner of street cleaning to \$600 for sweepers. The city is now divided into eleven districts, each under the charge of a superintendent. There are fifty-eight cleaning districts, each under the charge of a foreman. The superintendents and foremen are each responsible for the cleanly condition of the districts under their charge, and the sweepers are also held responsible for the length of street which it is their duty to sweep. During the first eight months of 1892 there have been removed a total of 1,260,221 loads of dirt, against 1,135,045 during the same period of 1891, an increase of 125,176 loads, or about 11 per cent. The new street cleaning law provided for 1,500 sweepers, 750 drivers and 88 hostlers on the start, with an addition to the force of 5 per cent per year. The commissioner, Mr. T. S. Brennan, reports that the system is efficient, but that while the advisory committee which formulated the new law thought the above force would be large enough at the start to clean the whole city, it has been found that at least twice the number of sweepers are required to clean all the paved streets and avenues, allowing one sweeper to each 600 or 800 feet of streets, according to width. The down-town streets are principally cleaned by hand and the upper part of the city by machines, operated at night.

Before the Clermont.

It is not generally known that the first steamboat ever built in the United States was partly constructed in Frederick county in the year 1785. The vessel was built by James Rumsey at Shepherdstown, W. Va. Robert Fulton with his Clermont was anticipated by Rumsey twenty-two years. The steamboat was fitted up with machinery partly manufactured at the Catocin furnace of the Johnson Brothers, near Frederick. The boiler, two cylinders, pumps, pipes, etc., were manufactured in Baltimore. Some portions of the works were made at the Antietam Iron Works. On March 14, 1786, a public experiment, the first ever undertaken in America, was made on the Potomac river. Rumsey succeeded in attaining a speed of four miles an hour against the current.

The steamboat was eighty feet long. It was propelled by a steam engine, which worked a vertical pump in the middle of the vessel, by which the water was drawn in at the bow and discharged through a horizontal trunk at the stern. The boat bore a load of three tons. The weight of its machinery was 666 pounds. The whole of the machinery, including the boiler, occupied a space but little over four feet square. Two distinguished men were patrons to Rumsey's experiment—George Washington and Governor Thomas Johnson of Maryland. The experiment was made in the interest of the proposed Chesapeake and Ohio canal. Rumsey clearly and satisfactorily demonstrated that a boat could be propelled up stream against the current.

Thus we find that the first steamboat was propelled on the Potomac and a portion of the first machinery made in Frederick county 107 years ago.—Frederick News.

Mustard.

A writer in the *Pharmaceutical Record*, describes as follows the manner in which mustard is prepared for use as condiment, giving the results of his experience while in the employ of a leading spice-grinding firm:

The mustard seed used was a mixture of the white (California or European), two parts, and black (Trieste), one part; these were put through a winnowing machine to remove dust and other accidental material, and then ground together. The ground cake is then expressed to remove the fixed

oil (mustard oil), again ground and then sifted twice. The resulting powdered mustard is not more than one-half the weight of the original seed employed, the color a grayish or ashen color, more like corn meal.

A record of one lot, showing materials used and entire product, will not be without interest: 1946 pounds (1300 pounds white mustard, 646 black) were cleaned and ground separately, the cakes, weighing respectively 1273 and 640, equaling 1913 pounds, a loss of 33 pounds. When pressed the yield of oil was 204 and 128, equaling 332 pounds. Subsequent sifting removed the hulls of the seed; the amount of powdered turmeric used to give it the desired color was four pounds, and the entire yield of ground product suitable to sell as pure ground mustard was 887 pounds. There was left 124 pounds of what was known as "tailings," which probably would, when mixed with the next lot, utilize about 30 pounds of mustard, but which could not be separated without adding comparatively too much cost to make it worth while.

The loss, therefore, in making a pure mustard from the seed will average one-half of the material used—1946 pounds original quantity; total product of ground mustard, 887 pounds. The oil, 332 pounds, equaling 44 gallons, is valued at about 60 cents a gallon, so that the total loss in dust, valueless husk, etc., is 727 pounds, which cannot be utilized except as the miller uses it as fuel.

Even a pure mustard may vary greatly in taste and effect. White mustard alone has nothing like the pungency of either the black or a mixture of the two varieties. Like the bitter almond or the peach kernel, the pungent volatile oil is not developed until it comes in contact with water, so mustard does not yield its pungency to alcohol, but to water. A pure ground white mustard is deficient in pungency; the black develops it without the mixture of the white, but when blended as suggested above it is much more acceptable than either alone.

Thirty Miles an Hour.

C. D. Mosher, the designer of the fast craft Norwood and other triumphs in the line of steam yachts and launches, is now completing a world-beater. It is a 78-foot boat, with 9 feet 6 inches beam, and it will greatly disappoint him if it does not exceed 30 miles an hour. The designs of boat, engine and boiler are all Mr. Mosher's personal work, and certain novel details of the boiler and engine are covered by his patents.

The engine is declared to be a marvel of lightness combined with power in compact form. It has just been completed by Lyndner Wright of Newark, and has been tried in his shop. It is of the quadruple compound type, with cylinders in a straight line, supported over an elliptical base of cast and wrought iron by means of slender steel vertical pillars, each pair of which is braced with straining rods in the form of an X split down through the point of crossing, and provided with a screw by which the braces can be strained until all racking is obviated. The stroke of the engine is 10 inches, and the cylinders are respectively 9½, 13½, 18 and 24 inches in diameter. Every ounce of superfluous metal has been removed from the castings forming the cylinders, and they are handsomely jacketed with sheet brass.

It is estimated that the complete engine will weigh less than 3600 pounds, and that at a speed of 500 to 600 revolutions it will develop from 500 to 600 horsepower, with a steam pressure of 250 pounds. It is said to be the lightest engine of its capacity in the world. To insure the minimum of weight with the maximum of strength, all of the working parts have been reduced to the smallest practicable dimensions, or are relieved of superfluous metal at the center by boring. The rock shafts have one-inch holes through them. The piston and connecting-rods are hollow, and the big crank shaft has been bored out wherever a tool could be used upon it. This shaft was carved out of a solid steel forging weighing 2012 pounds. It now weighs 414 pounds, and is a handsome piece of work. The crank-heads and shoulders are gracefully rounded. It required six months of steady work to make this shaft and over eight months in all to build the engine. When set up, it will occupy less than 14 square feet of floor space.

The boiler is under construction at the Hewes and Phillips Iron Works on the Passaic, in Newark. It is a pipe boiler of peculiar construction, and is built with a view of standing great pressure, occupying little space and steaming rapidly. When the Passaic river opens, the boat will be towed to the Hewes & Phillips wharf and then fitted with boiler and engine.

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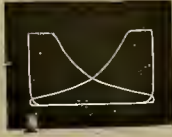
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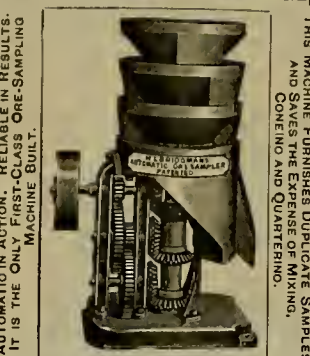
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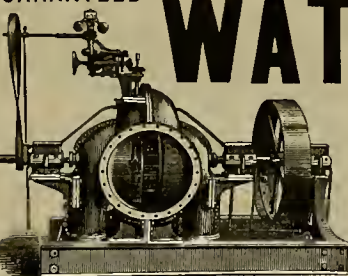
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The World's Fair Yachts.

The fleet of water craft to navigate the lagoons and basins at the fair is now calling for the labors of 200 or 300 shipwrights. The 50 electric launches for the lagoons are being constructed at Detroit and Racine. The larger boats for the basins and naval exhibits, commodious steam yachts in size, machinery and appointments, occupy the stocks in the shipyard of Charles P. Willard & Co. of Chicago, on the north branch of the Chicago river. There are 12 of these steam yachts, exactly alike above the water line. Alongside of them are five larger boats, all designed for World's Fair traffic next season. If there is time a half-dozen more will be constructed before the opening of the fair. The later additions will be smaller and have less engine power.

When Mr. Willard secured the concession of running boats on the basins he was confronted with the question of what he was going to do with a dozen boats after the fair was over. At best they would be second hand, and must be disposed of at some price. It could not be hoped that the profits of the World's Fair season, after handing over 25 per cent of the gross receipts to the Exposition Company, would be large enough to offset a big depreciation.

Acting on this idea, the boats were designed to be large and stanch. The exposition fixed the limit of length at 50 feet, and Mr. Willard took the limit.

Outside of the machinery the dozen boats for the basins and the five larger yachts are now nearly completed. The 17 standing side by side on the stocks make a pretty sight, even on a cold day with the wind and snow blowing though the chinks in the huge shed. On some the permanent cherry and mahogany awning is being fitted. On a pleasant day next April the procession will steam out of the North Branch and down Chicago river to the lake. No finer fleet of steam yachts ever specked Lake Michigan than will be these boats as they hug the shore on their way to Jackson Park.

When the first boat was completed, with the exception of machinery, Mr. Willard made a temporary launch. The boat was towed to a stone derrick by the river side, and exactly 29,500 pounds of stone was lowered into the boat. Just two feet of its white side was out of water. Although the displacement had been carefully figured, still there might have been an error, and the shipbuilder was taking no chances. Counting the machinery, fuel and permanent fittings to weigh five tons, the boat would have a carrying capacity of ten tons. This left a wide margin for the local steamboat inspectors, who passed on the plans and fixed the Government limit at 75 passengers.

All 17 boats will have triple-expansion engines exactly alike. The cylinders will be 4½, 7 and 12 inches in diameter, with 8-inch stroke. The boilers will be the Roberts safety water-tube style, to stand the Government test of 200 pounds pressure to the square inch. Running wide open, the machinery will develop 100-horsepower. With the ordinary cut-off of steam they will show an economical working force of 83-horsepower. This is in excess of the requirements at the fair, as high speed will not count for much in the short runs, but after the fair is over a good 12-mile boat will be much more salable than one of less speed. The machinery alone will cost over \$3000 for each boat.

The World's Fair yachts are built with rather bluff, straight bows, and are intended to sit squarely in the water. The boilers and engines are amidships, and are low down in order to lower the center of gravity. A cabin, the roof of which is three feet above decks, will cover them. The steering-wheel will be in the open space at the bow. Awnings, supported by permanent frames, will extend the entire length. The engines have bronze connecting rods and will be highly ornamented. They will run without noise, and, as the furnaces will use hard coal, the boats will be pleasant for sightseeing. The planking is of oak and white cypress, 1 and 1½ inches thick. The frames are of oak. Brass openings, with automatic valves, take the place of the usual "scuppers" by which water runs from the deck on a heavy sea.

The five larger steam yachts are trim in model. They are 66 feet keel, 74 feet long over all, and 10½ feet wide. They will have a cutter bow, with bowsprit, and two spars, fore and aft. Being extremely sharp, they will have greater speed on the same power than the shorter boats. The boiler and engine will be housed in, but otherwise the decks will be free. Awnings, held by the spars, will be their covering. The rail is handsomely paneled in quarter-sawn oak. These yachts will cost about \$7000 apiece. They will be for charter during next sum-

mer to private parties, who prefer that way of going to Jackson park.

Already clubs are being formed among residents of the North Side to charter or buy steam yachts for next season. The example of the Buena Park Club in having its own steam yacht, has called general attention to the pleasures of yachting on the club plan, and Mr. Willard has prepared for quite a craze in that direction by having speedy and commodious boats, which can be chartered by those who do not care to buy. The five will be ready for service at the same time the dozen will sail for the fair-grounds.

How the Telephone is Managed in Roumania.

The two Roumanian cities, Galatz and Braila, on the Danube, were lately connected by telephone, which is, like the telegraph in that country, an institution of the State. Before its opening, an ordinance of the Government for its use was published in the official gazette, the principal part of which is as follows:

"A person who wishes to communicate with another by telephone is bound to notify that person beforehand by letter, telegraph or otherwise."

A dealer in produce in Braila was about to close a contract for a supply of barley. He desired, however, to learn beforehand the price of the barley quoted at the Board of Trade in Galatz. For that purpose he went to the telephone office, and, after the fee, desired to get telephone connection with his correspondent in Galatz.

"Very well; have you informed that gentleman?"

"What for? He is in Galatz, and the person to whom I want to telephone."

"That would not do, sir. Here is the ordinance. Before you can telephone to him, you must inform him beforehand by letter, telegraph or in any other way."

"Nonsense! Is the Government crazy? Maybe they ask me to travel to Galatz and inform him that on a certain day and hour he may be at the telephone office to receive a communication from me?"

"Yes, that would do, too," the official said.

The merchant was obliged to give up his barley deal.—Electrical Review.

RAILWAY MILEAGE.—Railway mileage in the United States on June 30, 1891, was 168,402.74 miles. This figure indicates the length of single track mileage, the total mileage of all tracks being 216,149.14 miles. The length of single track per 100 square miles of territory, exclusive of Alaska, was 5.67 miles, and the length of track per 10,000 inhabitants was 26.29 miles. Some of the States are exceptionally well provided with railway facilities, as may be seen by the table of the report which shows the length of line in the several States per 100 square miles of territory. Such assignment shows for Connecticut 20.77 miles, for Delaware 16.10 miles, for Illinois 18.25 miles, for Iowa 15.12 miles, for Massachusetts 25.99 miles, New Jersey 27.71 miles, for New York, 16.19 miles, for Ohio 19.68 miles, for Pennsylvania 22.77 miles. The only countries in Europe which have an excess of 10 miles per 100 square miles of territory are Germany with 12.77 miles, Great Britain with 16.52 miles, France with 11.23 miles, Belgium with 28.71 miles, Holland with 13.83 miles, and Switzerland with 12.43 miles. No country in Europe, Sweden alone excepted, has 10 miles of railway per 10,000 inhabitants.—Interstate Commerce Commission.

OIL LANDS AND MINING LAWS.—The oil men of California are much disturbed over a bill introduced by Senator Stewart in December, 1891, affecting the mining law, and reported back by the Committee on Mining in February, 1892, with amendments. The bill describes how locations shall be made, how much assessment work shall be done each year, how patents can be secured, and restricts the area of placer claims to 40 acres. The Committee on Mines placed petroleum land in the same category with the placer ground, and the feeling of the oil men is best told in a telegram just received by Congressman Bowers, as follows: "Senate bill 54 has been sent to the House. Have all action deferred until the petroleum oil miners can be heard. The bill, if passed, will stop the industry in public mineral land. Oil ground cannot be held or worked at a profit in 40 acres, or any small tract, as proposed by the bill. A complete showing can be made by sworn evidence and Government reports that the bill should not pass." It is not probable this bill will pass this session at any event.

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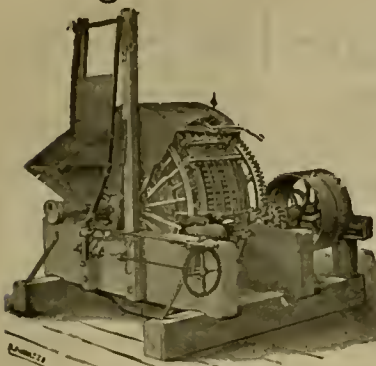
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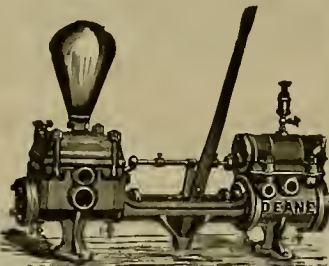
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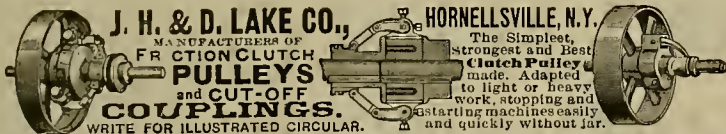
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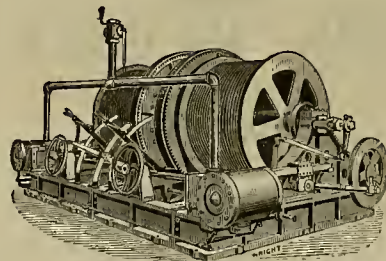
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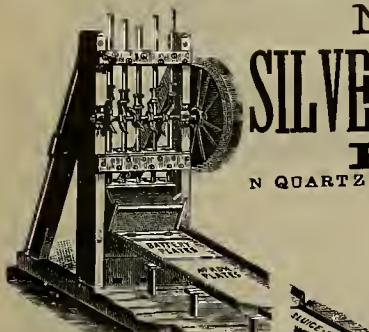
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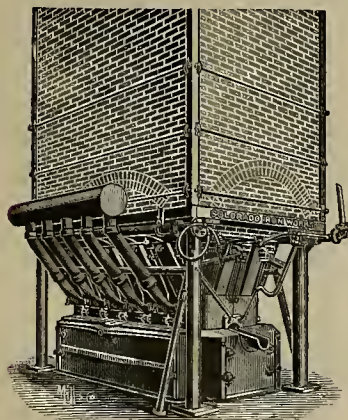
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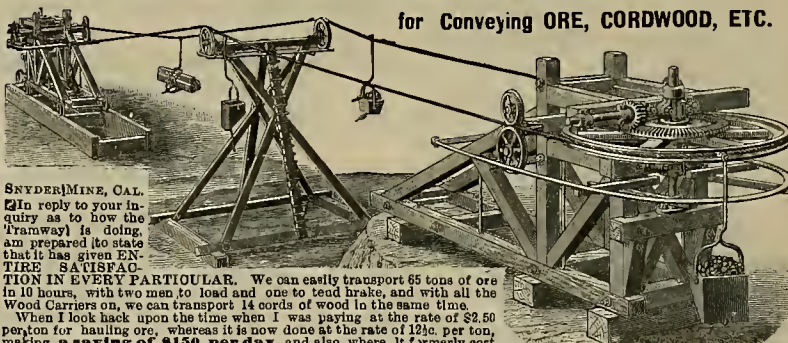
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VULCAN WIRE ROPEWAY,
 for Conveying ORE, CORDWOOD, ETC.



SNYDERMINE, CAL.

In reply to your inquiry as to how the 'Tramway' is doing, am prepared to state that it has given ENTIRE SATISFACTION IN EVERY PARTICULAR.

We can easily transport 65 tons of ore in 10 hours, with two men to load and one to tend brake, and with all the Wood Carriers on, we can transport 14 cords of wood in the same time. When I look back upon the time when I was paying at the rate of \$2.50 per ton for hauling ore, whereas it is now done at the rate of 12 1/2 c. per ton, making a saving of \$150 per day, and also, where it formerly cost me \$5.50 per cord for wood delivered at mill, it now costs me but \$3 per cord, making a saving of \$2.50 per cord—I must say that I feel pretty well over my Tramway investment for it is a PERFECT SUCCESS.

JAMES BARRON, Supt.

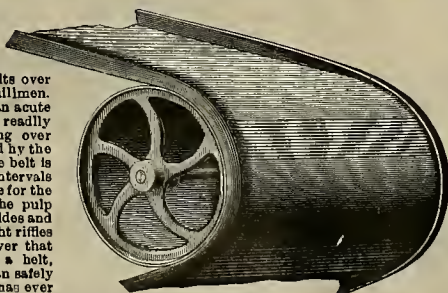
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THE BLASDEL CONCENTRATING BELT COMPANY.

We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the slides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



PLACER AMALGAMATORS

Combined with Steam Shovel or Dredge.

BUCYRUS SYSTEM.

NEW METHOD OF PLACER MINING.

Seves all the Gold. Uses very little Water. Treats large quantities at Low Cost.

—BUILT SOLELY BY THE—

BUCYRUS STEAM SHOVEL AND DREDGE COMPANY,

BUCYRUS, OHIO, U. S. A.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH QUARTZ IN VOLCANO DISTRICT.—A *Madro Ledger*, Feb. 23: At the Irma gold mine, near Volcano, they have found another ledge in the shaft at a depth of 175 feet, which is from 12 to 18 inches in width, and prospects very rich in free gold. This vein crosses the Griesbach ledge on the surface down to 40 feet milled \$30 in free gold; from the Griesbach 700 tons yielded \$40,000 without the sulphurets. The ore contains fully 10 per cent of sulphurets, which vary from \$200 to \$800 per ton. By the middle of February a station will be cut on the 200-foot level, and drifts run north and south, when stoping will be commenced and rock taken out to keep 10 stamps going. The Newton Company, which has been prospecting on Jos. Mason's ranch for gold-bearing quartz, after sinking 53 feet on the ledge, are so well satisfied that they will run a tunnel to the shaft. The prospectors are now engaged in perfecting articles of incorporation. The ledge upon which they are working is more than a mile long upon Jos. Mason's land, and he has agreed to deed them 1500 feet whenever they find milling ore in paying quantities. These people are greatly pleased with their prospect, and if they strike the ledge in the tunnel, and it looks as well as it did in the shaft, they will put up a mill. Wm. Love and Emmet Meehan have found a very rich prospect of quartz out near the river.

AMADOR GOLD MINA SOLD.—The sheriff sold the Amador gold mine on an execution issued on a judgment held by J. P. Darling. Mr. Darling bought the property in for the amount of his judgment, the amount of the judgment liens and the expenses making a total of \$7,027.22. This is subject to a redemption in six months.

Butte.

THE CATSKILL MINE.—*Matysville Democrat*: On Saturday last the Catskill Mining Company, of Bangor, made its usual weekly cleanup, and realized for the week's run about \$1000. They are not running their arrastres regularly on account of having to use green wood in the furnace, in consequence of which half-time only can be put in. When we consider the fact that only a part of the week was really worked, the cleanup was a very large one.

Calaveras.

MURPHY'S.—*Calaveras Citizen*, Feb. 4: At the Norfolk, a large number of miners are now at work on the gravel-bed lying east and in close proximity to the quartz vein. The gravel is rich, and a good cleanup is looked for. A successful run has just been concluded in the Campbell mine, on Indian creek, from quartz selected from the dump of the Washington mine. The cleanup was very satisfactory. Caesar Corporandy & Co. have opened up a fine body of auriferous gravel in their mine on quartz gulch, adjacent to town, near the old "Salts and Senna" claim, worked some years ago by Dr. Jones & Co. The bonding of Blood's mine, the old Collier property, will again draw attention to this much-neglected district. Quartz of exceeding richness has been taken out of this mine in time gone by. The advantages of developing a good mine there is great. The mill and the mine of the Beatrice Co. is all that is claimed for it. The mill is running smoothly, and stoping in the lower levels opening up new riches. The few miners at work find no difficulty in keeping the mill constantly running. The ore-body is large and easy of extraction. Five more stamps are to be added at once; preparatory work is being done now to place the battery in position. The past week brought no incident of interest other than the visit of several mining and mill men to our town to further the end in view of owners to perfect operations in some of our mills, and to complete arrangements to start developments in mining properly in several mines of known repute. That our mines are coming into notice is evidenced by the fact that inquiry is almost daily made about them. Supervisor McCormick and his partner, W. A. Bisbee, were in town last week. They, in connection with Wm. Thomas, were engaged the past 12 months in running a tunnel to tap their gravel mine on Central Hill. Hard slate has been encountered, and to accelerate work they have under consideration the placing of a Burleigh drill in the tunnel. Over 1100 feet have been run. There is still some 600 feet yet to run to strike pay gravel.

Humboldt.

WILLOW CREEK.—*Cor. Blue Lake Advocate*, Feb. 4: There has been a good deal of snow in the Willow creek section this winter so far, but it has been not a little cut down by the rains, which have been heavy, until at this writing there is none of the "beautiful" in sight excepting, of course, on the distant mountains. Messrs. Getchell, Little and White have combined to work the Getchell claim this winter. So far as operations have gone, prospects are fine. John Haney, owner of the Haney claim, is meeting with his usual success. Anybody who has ever lived on the creek knows what that means. John S. Kelly is hammering away on his mine. Other claims are being worked, the Cora and the Curran being among the number. However, as might be expected, the high water has retarded operations along the creek somewhat. It is a significant fact that the assessment work on all the claims has been so promptly attended to. This is one of the many evidences that might be adduced of the confidence in the future of the Willow creek mines.

Sons Eureka parties have lately become interested in certain Three creek mining properties. These properties are to receive attention the coming spring. The general outlook here may be characterized as good. There is no burrah, but a quiet, persistent industry which tells in the long run. All mines equally well worked are panning out equally well. A good deal of prospecting will be done in this locality the coming season. The attention of many prominent mining-men is being drawn to this district, all of which augurs well for its future.

El Dorado.

FRENCH HILL.—*Georgetown Gazette*, Feb. 2: Development work on the French Hill quartz mine, between Spanish Dry Diggings and the river, has been progressing for the past two months under a Sacramento company. The tunnel is now in 75 feet. Six men are employed. This is one of the rich producing mines of earlier days, which has been lying idle.

BEAR CREEK.—*Georgetown Gazette*, Feb. 2: H. Wagner has bonded his seam mine on Gold Hill to G. W. Cummings. This is undoubtedly a good mine, and in all probability will be a sale. O. S. Grover has got his gravel mine on Bear creek in good running order, and soon expects to be washing out nuggets. Mr. Robinson of Mrsquito has been in the vicinity of Georgetown for the past week looking at the mines. He seems to be very favorably impressed with that locality, and thinks of locating there.

Kern.

THE ASPHALT MINES.—*Bakersfield Californian*, Feb. 4: Regular trains began running on Thursday, and matters at Asphalt are now assuming a very lively air. A number of buildings dot the place to house the men engaged in mining asphalt and drilling for oil. The poof and boom of the blasting go merrily on every day, and large quantities of asphalt are being piled up. The extent of the deposit thus unearthed is making the hearts of the company's officials glad, and astonishes the visitors who already appear to be "spying out the land." The first train on Thursday carried a good load of passengers. The company, encouraged by the output and development, have expert builders on the ground, and the plant and kettles for refining are being erected with a view to the handling of large amounts of asphalt with the utmost economy in time and labor. Loading chutes, kettles, tracks and dumpers are all arranged with a view to these ends. The railroad has already established cattle corrals, turntable, etc., and will no doubt soon require an agent to care for the large freight business, besides that of the asphalt company, which is already finding its way to Asphalt as a shipping-point from the Carissa plains and the hundreds of square miles north, south and west which are now brought near to this station, and are dotted with cattle and sheep men and ranchers and homesteaders. We understand funds have already been subscribed in Bakersfield to build a good wagonroad to the country westward, tapping a territory heretofore tributary to San Luis Obispo. This is a business-like proposition. The railroad built more wisely than they knew in reaching simply after the extensive asphalt deposits as their objective point for the new branch.

Nevada.

GOOD CLEANUP.—*Grass Valley Telegraph*, Feb. 4: The mill at the Pennsylvania mine has been running of late and on good ore. There were 16 tons (not loads) put through the mill recently, and it paid about \$25 per ton, not counting sulphurets. It is reported that the Pennsylvania has a little bonanza out there.

THE GOLD FLAT MINE.—*Grass Valley Telegraph*, Feb. 1: We have a piece of ore from the Gold Flat mine which is excellent in quality as milling ore. The mine is situated just the other side of the Town Talk and is near the Narrow Gauge railroad track. We had a conversation with Mr. Bennett May, who knows all about the property, and he regards it as the best prospect for a mine that there is in that portion of the county. Mr. May thinks that there are three chutes of ore in the mine, the first being 75 feet in length and averaging 15 inches in thickness, the second being 100 feet in length and varying in size from six inches to two feet, and the third being 250 feet in length and varying from three feet to one foot in width. The ledge in the drift is now 20 inches wide and in good ore. A mill on the property would soon crush out gold enough to pay dividends. More than one excellent miner is of the same opinion.

Sierra.

THE ORIENT MINE.—*Mt. Messenger*, Feb. 4: The main tunnel of the Orient Gravel Mining Company has now reached a point within about 30 feet of the bottom of the shaft which was sunk to the channel several years ago. The tunnel, if we remember correctly, is something over a thousand feet long, and all of it is through hard rock. This is the second tunnel run, the first being 80 feet too high. To push the second tunnel to completion has been an arduous undertaking. John German and son of San Juan are largely interested, and have the greatest faith in the ultimate success of the claim. The shaft above noted was sunk several years ago, and from drifts run from the bottom an excellent prospect in coarse gold was obtained. The new tunnel strikes the channel somewhat lower than the bottom of the shaft, and will thoroughly drain the channel which it taps at the western or down-stream end. Persons familiar with this section where the claims are, have no doubt of there being a large channel in the ridge, as Indian creek, one of the richest creeks in the mountains, was fed from the ridge under which the Orient claims lie. The locations follow the trend somewhere in the vicinity of "Nigger Tent." Nearly, if not quite all, the owners of this property live at

San Juan and vicinity, and deserve all the good luck which seems in store for them.

Siskiyou.

GRAVEL.—*Yreka Journal*, Feb. 8: Lee, Lash & Co. are still getting out good pay from their blue gravel claim on Greenhorn, about a mile south of Yreka. They are running a tunnel along the old channel at a depth of over 100 feet below the surface, and expect to take out considerable gold this season, by having a first-class pump to afford good drainage. The blue gravel in which the gold is found is evidently the channel of a large stream of the prehistoric times, or possibly a large lake. The development of this claim will also be the means of ascertaining the true course of the channel, which is believed to extend from the Siskiyou mountains to and through Yreka basin, and thence southward to the Sacramento valley. A great amount of snow has been piled up on the mountains surrounding, during the continued storms prevailing most of last week, which will be of great benefit to miners in the spring and summer months. The weather has been so cold, however, since the storms ceased that the water supply is frozen so as to prevent any mining at present, except in drifts and tunnels, especially in the high altitudes.

QUARTZ VALLEY.—*Yreka Union*, Feb. 4: Active preparations are being made to start up in full blast mining operations in the Quartz Valley district in a few days.

Trinity.

THE TRINITY RIVER MINES.—*Cor. Trinity Journal*, Feb. 21: There are more hydraulic mines working in the vicinity of Junction City than the people outside of the county are aware of. In all probability there is no other mining town in California where that class of mining can be pursued without interference—certainly not within the knowledge of the writer, who has made frequent visits to nearly every mining camp in the State. Commencing at the Evans' Bar claims of H. H. Carr & Sons, on the east side of the river, we cross the river to the claim now being worked by a large company of Chinamen, from whom it is almost impossible to obtain any information. After leaving that claim, we go to the Last Chance claim, belonging to Ham & Marsh, then to Chapman & Fisher's and Mrs. R. Gribble's, after which we cross to the east side of the river to the Good Friday mine, then to the Sheridan Bros., then to the Haas mine, opposite which are the old Sturdivant and Pickett claims, the latter of which is part of the Hayes' property; then down a mile farther, on the same side of the river, to the Hayes' gravel mines, where six giants and 30 or more men are employed. Owing to the fact that piping operations had not commenced on this property at the time of our visit, we concluded to wait until our return from the lower Trinity, at which time they will probably be washing under full pressure. Continuing on down past the Hocker property, we reach the David Evans' claim of 95 acres, now being worked by Messrs. Begel and Day. The water is carried to the claim by a mile and a half ditch from Canyon creek. Two giants are in use with four and five inch nozzles and about 400 inches of water, with a pressure of about 80 feet. For many years this has been a good paying claim. We next reach the Jacob's mine (drift and hydraulic), which we propose to visit on our return to Junction City. Then last, but not by any means the least, we reach the Lorenzo & Leibbrandt property, which is the last of the mines now being worked between Junction City and North Fork. This magnificent property consists of 882 acres, lying on both sides of the river and about four miles below Junction City. This property has been worked steadily since 1853, and by its present owners since 1872. Many hundreds of thousands of dollars have been produced, and we are informed that it still pays well. At the time of our visit 13 men were employed. About two acres of ground are worked off each season, and the bedrock is about the roughest the writer has ever seen. There are deep depressions in it many feet in depth, and in some places it must have been very difficult to work. There must be at least a half-mile of bedrock uncovered, a great deal of which has never been cleaned up. The McGillivray ditch, ten miles long, brings the water from Canyon creek. This ditch has a capacity of 3000 inches; there are four other ditches each about a mile long. There are about 4000 feet of pipe from 8 to 22 inches in diameter on the property. There are many acres of gravel in high benches all along the river between Douglas City and North Fork awaiting the advent of capital to bring water to them.

NEVADA.

Washoe District.

CON. CAL' & VA. MINE.—*Virginia Chronicle*, Feb. 4: 1500 level—We continue running water through the old stopes at different points, and continue the extraction of ore and fillings in working upward from the sill floor in the old stopes. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the npraise connection with the 1500 level north drift. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the npraise, No. 6 carried up from the main north-west drift; also from the old stopes in working north from the crosscut run west from the north-west drift. Have extracted during the week from the 1500 level stopes and 1650 north-west drift openings and raised to the surface 389 cars of ore about 389 tons; average assay value of which, per mine car samples, is \$30.63 per ton. Shipped to Morgan mill 359 400-2000 tons of ore. Average assay value, per railroad car samples, \$31.05 per ton. The Morgan mill commenced to work this ore to-day.

OPHIR.—1465 level—The npraise started on the

sill floor, on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground, 101 feet below the sill floor of this level, has been carried up 3 feet; total height, 99 feet; and connected with the north lateral drift on this, the 1465 level. At the point of connection we are cutting out a chamber in which to place an engine for the purpose of hoisting and lowering cages through the npraise.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 18 feet; total length, 515 feet, and is in a softer vein porphyry formation.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 26 feet; total length, 646 feet; face in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 21 feet; total distance west of the joint shaft, 2838 feet; face in hard porphyry.

UNION CON.—900 level—The joint Union Con. and Sierra Nevada west drift has been extended during the past week 21 feet, making the total distance west of shaft, 2838 feet. The face is in hard porphyry.

CHOLLAR.—The north drift from the south line, 550 level, is out 137 feet; face shows bunches of fair-grade ore. The east crosscut from the north drift, from east crosscut 160 feet south of north line, 930 level, is out 50 feet; face in porphyry. Are retimbering the two north compartments of the main shaft above 930 level.

POTOSI.—The east crosscut opposite the Potosi winze, 930 level, is out 289 feet; face in porphyry. Have started a drift south from this crosscut, at a point 30 feet back from the face, which shows streaks of quartz; the drift is now out 10 feet. South drift from top of raise, 1000 level, is out 98 feet; face in porphyry and low-grade quartz. The north drift from top of raise, 1000 level, is out 50 feet; the whole face is in quartz, car samples from which average \$20 to \$25. Have commenced grading the north-west drift, 1800 level, Ward shaft, and are now timbering the station at bottom of Potosi winze. Extracted and sent to the mill the past week 441 tons of ore from the 550, 930 and 1150 levels. Milled during the week 441 tons; on hand at mill, 80 tons and 1250 pounds. Average battery assays, \$23.56. Average car sample assays, \$27.07. Shipped to U. S. Mint, Carson, 440 pounds crude bullion.

BULLION.—The east crosscut, 100 feet north of top of raise from east crosscut, 320 feet south of north line, 1300 level, is out 75 feet; face is in porphyry and quartz. The west crosscut from the north-west drift, 300 feet south of north line, 1800 level of Ward shaft, is out 240 feet; face in low-grade quartz and porphyry.

ARAX.—During past week have been running the north tunnel in a northerly direction, parallel with the ledge. This tunnel is to be run into the Daniel Webster, from which point the company will run crosscuts and sink winzes to expose the mineral belts of both these mines.

WARD SHAFT.—Have completed putting in the pressure pipe to the 1800 level, and are now making connection from it to our blowers. The west crosscut from the north-west drift, 300 feet south of north line, 1800 level of the Ward shaft, is out 240 feet; face in low-grade quartz and porphyry. Have completed grading the north-west drift, 1800 level, and are now timbering the station at the bottom of the Potosi winze.

EXCHEQUEA.—Have completed putting in the pressure pipe to the 1800 level of the Ward shaft, and are now making connection from it to our blowers.

ALPHA.—Have completed putting in pressure pipe to the 1800 level of the Ward shaft, and are now making connection from it to our blowers.

NEW YORK.—We ceased shipping ore to the Washoe mill on the 30th of January, our contract with the mill having expired. Will ship to a river mill as soon as the roads will permit. Have resumed sinking the incline winze below the 650 level. The repairs to the southwest drift from the shaft, 850 level, are completed. The west crosscut from the southwest drift from the shaft, 850 level, is out 21 feet; face is in clay and porphyry. Shipped to the Washoe mill during the past week 131 tons, 1172 pounds of ore; milled during the week 191 tons, 1174 pounds of ore; on hand at mill, none; average battery assays, \$32.70; average car sample assays, \$38.10. Shipped to U. S. Mint, Carson, 437 pounds of crude bullion.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 6 feet, through hard porphyry and small seams of quartz; total distance from north line, 42 feet.

KENTUCK.—We continue to extract about 2 tons of ore per day from the stopes above the east crosscut on the 160 level. Have commenced to open the 1100 level through the Jacket shaft.

UTAH.—340 level—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 23 feet; total length, 64 feet; continuing in vein porphyry and clay formation. No decrease in the flow of water from the face of west crosscut No. 3.

BEST & BELCHER.—200 level—At a point in north drift, 17 feet in, we have started a west crosscut, No. 1, and extended same 18 feet during past week, passing through clay and bunches of quartz. 900 level—West crosscut No. 3, started from top of npraise No. 1, from 1000 level, has been advanced 12 feet; total length, 119 feet; face in soft porphyry. Also did some repairing during the week.

OCCIDENTAL.—The main north drift, 750 level, has been extended 17 feet; total distance

from No. 1 winze station, 640 feet; face is in quartz with streaks of pay ore. No. 2 winze from south drift, 750 feet, is down 50 feet; bottom in low-grade ore. The Zedig drift, Sntro tunnel level, has been extended 25 feet; total length of main drift, 805 feet; face in hard porphyry.

ANDES.—On 420 level north drift from east crosscut No. 1, north, was advanced 18 feet; total, 81 feet; formation, quartz.

GOULN & CURRY.—200 level: During the past week, west crosscut No. 5, started 432 feet from main west drift, has been advanced 8 feet, passing through hard porphyry; total length, 278 feet. On the Sntro tunnel level the joint north drift with the Savage Co. has been extended 14 feet; total length, 872 feet; face of drift in hard porphyry. We still have about 11 feet to go before we reach our south boundary line.

HALE & NOECROSS.—We continue retimbering main shaft above the 500 level. Main Incline—Are making the necessary repairs. 1400 level—Have started to retimber the main north drift on this level. 1800 level—Have been making repairs to main north drift the past week. West crosscut No. 1 from the main south drift was advanced 20 feet; total length, 95 feet; face in porphyry. No. 3 west crosscut from main north drift was advanced 18 feet; total length, 290 feet; face in porphyry. West crosscut No. 4 from main north drift was advanced 17 feet; total length, 139 feet; face in porphyry with seams of quartz.

Ely District.

GOON ORE.—Speaking of several lots of ore treated by Prof. Garvin, superintendent of the Gervase-Brown electric mill, the Salt Lake Journal of Jan. 26th says: "Another lot from Ely, White Pine county, Nevada, running 4½ ounces gold, was roasted five minutes with five per cent salt, and leached 12 hours, saving all but a trace. Mr. Frank, who brought in the ore, was there when the test was made, and took his own samples. Prof. Garvin is known all over the West as a conservative and reliable metallurgist, and his statements can be implicitly believed." The ore referred to above was shipped from the Jona mine two weeks ago by H. H. Brown, of Helena, Montana, who has been taking ore from all parts of the mine for a month past.

Ferguson District.

DULL.—White Pine News, Feb. 4: Lew Carpenter and W. J. Peters, who left for Ferguson district two months ago, returned Sunday last. They report everything down that way dull in the extreme.

Osceola District.

LOCATIONS.—White Pine News, Feb. 4: More location notices have been received from Osceola this year at the recorder's office than from the rest of the county combined.

ARIZONA.

NO BOTTOM YET.—Tomhstone Epitaph, Feb. 5: The shaft at the corner of Fremont and Seventh street, being put down by T. M. & M. Co., has reached a depth of 80 feet, and 15 feet below this point the diamond drill has penetrated without striking solid formation. How far the shaft will have to be sunk before drilling ground is reached is an unfathomable mystery. The depth of loose ground at this point has been a source of surprise to old mining men, who predicted that bedrock would be encountered in from 30 to 50 feet. It would not be a surprise now if a depth of 150 feet would fail to get through what now seems to be a deep gorge filled with sediment from the adjacent mountains. Until this is reached, no attempt will be made to renew operations with the drill.

ORO BLANCO MINES.—Citizen, Feb. 4: Geo. W. Cheyney, speaking of his mining property at Oro Blanco, said everything was in splendid shape, and there was an unlimited supply of fine mineral, and the only drawback was a scarcity of water. His men are operating four large hand-jigs, and are compelled to have them so placed that the water which has been used in an upper jig can be run off and saved for the next below, and so on down. He has even had to pack water on burros and have it brought up the hill for operating purposes. C. W. Kempton, superintendent of the Ansterlitz Mining Company, had, he said, lately sunk a new shaft to a depth of 130 feet, which would be used as a working-shaft as well as for water, the flow of which was surely increasing. The Ansterlitz mill is about finished and ready to start.

IDAHO.

ON A COMPREHENSIVE PLAN.—DeLamar Nugget, Feb. 4: An important deal has been about consummated which will in a very few days start work on an extensive and comprehensive plan on the group of mines on DeLamar mountain, popularly known as the Lepley group, comprising the Chatanqua, Manhattan, Howe-Manhattan, Beck and three other claims, and fractional claims, all located in one compact group on the summit of the mountain, next west of and adjoining the DeLamar mines. All of these properties are located just where one traveling about the mountain would naturally locate the center of the greatest mineral deposits. Considerable work has been done upon them but no depth has been reached, and as the ground near the surface is considerably broken and misplaced, although large bodies of ore have been found the walls of the ledges have not been defined. When depth has been reached, there is scarcely a shadow of a doubt but what the group will prove to be an immensely valuable property. We are not fully informed as to the particulars of the deal, but understand that Wisconsin capitalists—among them are expert miners—have secured a working bond upon the properties for a considerable length of time, for which they are to begin work in a very few days and continue it with a large force of men during the term of their

option. Messrs. Lepley, Davies, Kent, Smith, Howe and others, all citizens of DeLamar and Silver City, are the owners of these valuable properties. We hope the capitalists who are now going to exploit them have the nerve to sink a deep shaft at some favorable point on the property. We have seen enough shallow tunneling done on our grand old hillion-producing mountain to convince the *Nugget* expert that that is not good mining. The new hoisting works, now completed on the DeLamar Company's property, are constructed for the purpose of sinking a shaft from the surface down to the mill-tunnel level. The tunnel starts in just above the level of the ore house of the present mill, and, when completed, will cut the vein series 482 feet vertically below the Wahl tunnel and 1100 feet under the summit. Eventually ore will be delivered at the mills by track in this tunnel, which will reach the first of the series of veins at a distance of 3600 feet. This is laying out work which it will take years to complete, but will make the mine development very complete as low as the creek level. It is seldom that a whole group of mines can be worked to such a depth without employing hoisting machinery.

BRITISH COLUMBIA.

SHIPPING ORE PAYS.—Nelson Miner, Feb. 3: To say that the Slokan district is rich is a waste of breath. Every one knows it by this time, but the following figures may be interesting, being based, as they are, upon no mere assay, but being the result of a shipment of over 300 tons of ore taken from the Freddie Lee. To simplify matters, we have taken an average of the total shipment, and treated it as one ton. The smelter returns show that the 300 tons averaged 70 per cent lead, consequently each ton of ore contained 1400 pounds of lead. Deduct 70 pounds from this for waste, and we have 1330 pounds, valued, say, at .0385 cents per pound, or \$51.20 per ton. In addition to this, each ton, on an average, was found to contain 125 ounces of silver, which, being valued at 80 cents per ounce, means \$100. The total value, then, of a ton of this ore is \$151.20. With thousands of tons of such ore as this in sight, a man might well be justified in thinking his fortune was made, but, unfortunately, he has to consider the means of getting his mine to the smelter, and it costs something to do this. The figures below show what the actual cost of transferring ore from the Slokan to Tacoma has been, by existing freight routes:

	Per ton.
Mining and sacking.....	\$10
Freight to Kaslo.....	40
Kaslo to Tacoma, via Nelson.....	15
Duty, 1½ cts. per lb. on 1400 lbs.....	21
Smelting and refining and freight of hillion to New York.....	22
Sacks.....	2
Office expenses.....	1
Total.....	\$111

These figures form a monument testifying to Mr. Wardner's pluck, which will last long after the Freddie Lee has been worked out. This shipment has only been an experiment, and when it comes down to real business and the mine is turning out 50 tons per day, as it will be doing in six months time, the cost of shipments will be considerably modified. It is calculated that the total cost of shipping to the smelter and treating a ton will be \$38, made up as follows, and, mind you, these figures are not imaginary estimates, but are actual rates offered by the transportation and smelting companies:

	Per ton.
Mining and sacking.....	\$ 5 00
Freight to Kaslo.....	7 00
To Tacoma, via Great Northern or Nelson & Fort Sheppard.....	7 50
Smelting, refining, etc.....	16 00
Sacks.....	2 00
Office expenses.....	50
Total.....	\$38 00

The duty on lead is not included in this calculation, as it is considered that by the time these come into force this tax will have been abolished. Taking these figures as a basis on which to work, mine-owners in the Slokan district can spend pleasant evenings in reckoning what they will be worth in a year's time. Fifty tons of ore per day, yielding \$113.20 profit per ton, will result in a year of 300 working days in the sum of \$1,698,000—a very pretty income for a mine that will not, when this sum shall have been earned, have been discovered for two and a half years; and when one considers that it is not one mine alone that can do this, but practically dozens, one begins to feel a confidence and belief in the future of the country which no temporary or local depression can shake.

MONTANA.

BOULDER DISTRICT.—Phillipsburg Mail, Feb. 2: An activity in mining matters prevails in Boulder mining district, notwithstanding the severe winter, which angers well for the future of the camp. Israel Clem and associates are developing the Eureka and an adjoining lode and taking out good ore. Morgan Johns, R. S. Leveridge, Mr. Maywood and Frank Lang are running a crosscut tunnel on the Jim Purtle lode, now famous for the high assay of its ores at discovery, which is the objective point of the crosscut. The tunnel when under discovery will be 175 feet long and the apex of the lode at that point will be 150 feet above the tunnel level. Peter F. Scherr, Charles Kadell, John Scherr and Christ Larson are running a 300-foot crosscut tunnel on their Bloomington lode, 2000 feet west of the Royal gold mine. The Bloomington tunnel is now in 125 feet, and has already crosscut three ledges, some of which give good prospects in the pan. Mr. Campbell and associates are also wintering on the Royal

gold mountain, developing their claim. In this case, cannot give particulars. The Royal Gold and Silver Mining Co. has some 500 feet of tunnel work let out by contract. The Mount Powell Mining Co. has something over 1000 feet of tunnel work let out by contract on two levels—the lower and the upper. Besides, the company is extending the middle tunnel and sinking winzes from its level by days' work. Rombauer & Johnson are wintering upon the Meta lode and Irving in the tunnel. They have a strong lode to work upon with high-grade ore in a winze below the tunnel level, which assays in gold, silver, copper and lead and very fine-looking quartz in the face of the tunnel.

NEW MEXICO.

COAL.—Silver City Sentinel, Feb. 4: It is reported that the Silver City and Northern Railroad will be extended to the coalfields between this place and Gallup this year. Work will be commenced within a few weeks, and as soon as the road reaches the coalfields the company will put large smelters at work reducing the iron ores at Hanover. If the plan for getting cheap fuel to the camp proves successful, it is quite certain that the Mineral Point Zinc Co. will erect large works at or near Hanover, for the treatment of zinc ore. There are large bodies of zinc ore which would pay for mining and treatment at works in the camp, but which would not pay to ship to Wisconsin for treatment at the company's works there. With cheap fuel at Hanover, the great copper mines of the Santa Rita Copper and Iron Co. could be worked on a very extensive scale. If the deposits of coal near Gallup are as extensive as they are reported to be, and the coal can be delivered at Hanover at such rates as have been figured on, it will take but a few months to make Hanover the most important mining and smelting center in New Mexico. Iron, copper and zinc ores are found in abundance at and around Hanover, and it is but a few miles to important silver and lead mines, which would become large producers if the ore produced could be smelted near the mines and at a low rate. A large smelting plant at Hanover would have the advantage of having an abundant supply of lime and iron at hand, while the smelters at El Paso and Socorro are obliged to come to Hanover for their iron, and can get fuel no cheaper than it could be brought to Hanover from the Gallup fields over the proposed railroad. The Brockman mill at Lone Mountain is running steadily on ore from the Brockman mine, which is producing ore in large quantities. The mill is doing better work than it did some time since. There is practically nothing at all doing in the mines at Georgetown. Lessees who were operating in the Mimbre Consolidated Co.'s mines have given up their leases and the outlook for the camp this year is anything but encouraging.

SOUTH DAKOTA.

OPERATIONS SUSPENDED.—Deadwood Pioneer, Feb. 3: The announcement, received in this city yesterday, that the Harney Peak Tin Company had suspended all operations, in both mine and mill, created considerable of a stir. Investigation proved the report correct, and the fact that the men were being paid off yesterday would seem to signify that the shutdown was meant to be of extended duration. No cause for this sudden and very unexpected move is assigned, although various solutions are volunteered. About all that is known outside of the management is that Superintendent Childs left for the East, ostensibly for New York, but returned to Hill City Wednesday, after an absence of but a few days, and that evening ordered that all operations cease. The number of men thrown out of employment is said to be upward of 400. This sudden change in the policy of the Harney Peak people is all the more confounding on account of recent reported rich strikes in the Tenderfoot and other mines of the company, and of the late heavy expenditure in mill improvements and approval and acceptance of such additions to their property. Some insinuate that the company has got tired spending money on barren property, but there are many who believe there is plenty of tin ore in the Harney Peak mines, and that the shutdown is attributable to internal differences in the corporation. One old and well-informed mine operator gave last evening as his opinion that the English stockholders had got tired putting up money for the New York stockholders to spend. It is a well known fact that there has been a strong difference of opinion between the English and American stockholders concerning the operation of the property. The former desired to place the operations under experienced Cornwall tin miners, but to this the New York stockholders objected, and it is not improbable this difference may have led up to the present suspension. In any event, all operations have been indefinitely suspended, and we are hardly prepared to accept as the correct cause of the suspension a telephonic statement that the company is about to put in new fire boxes.

UTAH.

THE SAN JUAN COUNTRY.—Denver Sun, Jan. 30: Cy Warman, the conductor of the New York Sun party, returned Sunday from the San Juan. He said this morning to a Times reporter: "I went clear through to the San Juan and spent two days there, and, as I believe, was the only newspaper man who went in that far. The other party who furnished matter for the press did business from Bluff City, a little Mormon town 100 miles from the placer mines. Of course there is gold in the San Juan, in the river and on the hill tops. There is gold anywhere and everywhere in southern Utah. But it seems to me that in the place of this excitement colors are fewer and farther between than at any other place in that section of the country. On my way over I heard of gold placer properties on the Colorado, and on my return I spent ten days panning and prospecting

on that stream. We took a boat and went down the river from Crescent creek or North Wash, a distance of about 50 miles. At Good Hope we spent two days, and in all the panning we never failed to get a color. The gold is coarser on the Colorado river, and is worth \$20 an ounce at the express office. At California Bar we found two men working a Kent placer machine. They cleaned up after running yards of dirt and got \$10 worth of dust, which we brought home with us. These men say they make from \$5 to \$8 per day of ten hours, handling the dirt twice. At this point Salt Lake people are aiming now to put in machinery, and the teams that brought us out will take back material for the Salt Lake men. The Henry mountains are a good mining district, a purely gold district, having both ledge and placer mines. I believe that during the coming summer there will be a great deal of prospecting in the Henry mountains and along the Colorado river; and that some good will come from the San Juan hoom, after all. I believe, too, that the men who persist in an attempt to keep up the fake boom on the San Juan will work a great injury to the rest. As to nuggets, there are few or none, the richest one, in one of the richest bars of the Colorado river, being worth less than \$1. There is lots of flake gold, and the poorest pan ore had in all our prospecting contained 40 colors, and we must have lost many others because of our inexperience. Indeed, the biggest pan we had contained about 150 colors. There are good wagon roads from Green river clear through to San Juan, 174 miles, so that machinery can be taken to any point along the route without trouble. The distance, however, to the Colorado river is only 10½ miles. If a man puts in \$25,000 at one of the large bars of the Colorado he can thresh out \$1,000,000. I heard from a reliable trapper, who has lived on the Colorado river six years, of very rich hare farther down; some below even the mouth of the San Juan. This same trapper spent 22 days on a low bar washing with no machinery except a pickle keg, and he washed out \$80. The low bars appear to be the richest, but they can only be worked in low water. And as low water lasts eight months, this country is a better place to work than some places farther north, which are frozen up seven months in the year. I believe that any man who understands washing gold can make good wages on the Colorado. But that is not the way to do it. What that community wants is capital. It wants improved machinery to wash out the ground. That is all there is to do; there is no question as to the existence of gold on that river. The same old trapper as above mentioned told me two years ago that he prospected on a tributary of the San Juan over in the reservation, and found placers worth \$3 a yard. But the Indians would not allow white prospectors on the reservation, or that strip of country recently opened up, which I understand never was a part of the Navajo reservation proper. The Indians were simply allowed to use this strip, which extends from the San Juan back 20 miles, and which lies directly opposite the scene of this last excitement, for watering purposes.

NEW PLANT.—Park Record, Feb. 4: Last week the Record published an article in reference to the Daly West, in which it stated that it had learned on good authority that the owners of that property had ordered a new hoisting plant like that of the Silver King, and would build a mill during the coming summer. This week the Record is enabled to tell its readers that the information is entirely correct. There is no longer any doubt of the richness of the Daly West, and next summer will see it join the ranks of the Park's big producers. The ore reserves uncovered are beyond the most sanguine expectations of its owners; and when it is stated that they are highly elated, only a dim idea of their pleasure is conveyed. The Record is pleased to note this verification of the faith exhibited by Mr. Daly and associates, and of the judgment of the host of miners who have always maintained that the Daly West was a big mine and that a deep shaft would certainly uncover a large body of rich ore. When it is considered that a large three-compartment shaft was sunk on this property a depth of 1200 feet at a cost of not less than \$50,000, to say nothing of the expense of moving and placing machinery and erecting buildings, our readers will understand why Mr. Daly and associates feel rather comfortable over the outcome and at the same time get an idea of what the difficulties are to open up a mine and get down to the ore before there is any possibility of any return. Even under the favorable conditions which have always surrounded this property, great chances were taken in the investment of that amount of capital, for the vein might have been barren at the point where it was intersected and remained so through the whole length of the property. At this writing it is not known just where the new mill will be built, what its dimensions will be, nor when work will be commenced; but the writer has positive information to the effect that the work will be done, and done during the coming summer.

FROM SAN JUAN.—Ferguson Lode, Jan. 30: J. J. Jennings arrived here direct from the San Juan country last Friday and will proceed down the country to Yellow Pine district. He says the new goldfields are a fake. The snow is deep, everything is sold at high prices, and travel is only possible over the rough mountain country with burros. Freight is three cents a pound from the nearest shipping point, and hundreds of idle men without a dollar are anxiously awaiting a chance to get out. The small amount of gold already discovered is on benches above the river and will require heavy machinery to operate or work the ground. He says the reports of mineral existing in the Henry mountains is well founded, and it is the firm belief of many prospectors that they will be the objective point when spring opens up.

Market Reports.

Financial and Commercial Review.

SAN FRANCISCO, Feb. 9, 1893.

The uniformity of prices of silver during the week just past has been its most notable feature. There was no change either in New York or London for three days, and the fluctuations since then have been very slight. As the time set for the reconvening of the monetary conference approaches there is renewed interest in its probable action. There was for a time fear that the conference would not convene at all, but the rumor, if there ever was any, seems to have passed. The nations participating in the conference are, most of them, anxious for some settlement of the question, and the unsatisfactory result of the previous conference has by no means been taken as an indication that no definite conclusion can be reached. Senator Jones, back from Europe, says England is the chief obstacle in the way of bimetalism—a statement, by the way, that is not altogether original or unexpected. But, nevertheless, there is a strong silver sentiment in England, and that nation will be compelled, in deference to public opinion, to share in the conference of nations on the subject.

THE METALS.—There is nothing to report in the metal market. Eastern advices are that copper is still weak.

Quicksilver Shipments.

The exports of quicksilver from San Francisco in January were as follows:

To—	Flasks.	Value.
New York	2,600	\$104,000
Mexico	375	15,650
Australia	200	8,400
Central America	20	840
New Zealand	12	420
British Columbia	1	40
Totals	3,208	\$129,360

The total for January is the largest for any month in several years, being nearly half as much as exported during the year 1892. In January, 1892, the shipments by sea were 637 flasks, against 379 for the same month in 1891.

The receipts at this port in the past month were 2243 flasks, against 1701 in January, 1892, and 1663 in 1891.

Subtreasury Report.

J. P. Jackson, Assistant Treasurer United States at San Francisco, reports cash on hand January 31, 1892, as follows:

United States notes	\$ 50,607 00
Treasury notes 1890	1,500 00
National Bank notes	18,665 00
Gold certificates	290 00
Silver certificates	172,405 00
Gold coin	26,358,415 50
Standard Silver Dollars	23,658,969 00
Subsidiary Silver coin	4,015,690 00
Minor coin	14,212 98
Total	\$54,290,754 48

Standard Dollars shipped in Jan.	\$31,000 00
Fractional coin shipped in Jan.	29,492 00

San Francisco Metal and Coal Market.

ANTIMONY.			
Per lb.	@	13 1/2	English, steel.
Refined, in car lots	@	7 1/2	Spot, steel.
Powdered, do.	@	7 1/2	Spot, steel.
Concentrated, do.	@	7 1/2	Spot, steel.
All grades jobbing at advance.	@	7 1/2	Spot, steel.
COPPER.			
Bolt	@	22	Spot, steel.
Sheeting	@	22	Spot, steel.
Ingot, jobbing	@	22	Spot, steel.
Do, wholesale	@	22	Spot, steel.
Fire Box Sheets	@	24	Do, do, 20x28.
IRON.			
Bar, base	@	4 1/2	Spot, steel.
Norway, base	@	4 1/2	Spot, steel.
PIG IRON.			
Eglington ton	@	20 00	Spot, steel.
Am. Soft No. 1	@	23 00	Spot, steel.
Oregon Pig	@	20 00	Spot, steel.
Pugot Sound	@	20 00	Spot, steel.
Clay Lane White	@	20 00	Spot, steel.
Lanlan	@	22 00	Spot, steel.
Thorndike	@	25 00	Spot, steel.
Garthrie	@	22 50	Spot, steel.
Barrow	@	22 50	Spot, steel.
Concentrated	@	22 50	Spot, steel.
CHROME IRON ORE.			
Per ton	@	10 00	Spot, steel.
LEAD.			
Pig	@	4 1/2	Spot, steel.
Sheet	@	4 1/2	Spot, steel.
Drip	@	4 1/2	Spot, steel.
ZINC.			
Per lb.	@	13 1/2	Spot, steel.
Refined, in car lots	@	7 1/2	Spot, steel.
Powdered, do.	@	7 1/2	Spot, steel.
Concentrated, do.	@	7 1/2	Spot, steel.
All grades jobbing at advance.	@	7 1/2	Spot, steel.

Eastern Silver Markets.

New York, Feb. 9.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.
Thursday	38 1/2	38 1/2
Friday	38 1/2	38 1/2
Saturday	38 1/2	38 1/2
Sunday	38 1/2	38 1/2
Monday	38 1/2	38 1/2
Tuesday	38 1/2	38 1/2
Wednesday	38 1/2	38 1/2

The Mining Share Market.

There has been no very encouraging news from the Comstock the past week and no active developments in stocks. It is telegraphed from Denver that J. L. Flood and several other California capitalists are in that city with a view to establish an exchange of business between the Mining Exchange of Denver and that of California. Their plan is to list on the San Francisco Exchange some of the great mining stocks of Colorado, and to list on the Denver Exchange, California and Nevada properties. Those mentioned by the Denver telegram as California stocks are the "Comstock," Virginia City, Ophir,

"Consolidated Comstock and Virginia." That's pretty good! Such is the fame of the Comstocks outside our borders. It shows how Denver mining-stock sharps are posted about our doings. The rest of the dispatch says: "The gentlemen visited the Exchange this morning and were warmly welcomed. They talked of their plan and proposed that to carry it out and secure the benefit of such connection, a special wire be worked between the two Exchanges. This afternoon at a meeting of the Mining Exchange a committee consisting of W. B. Root, W. C. Wynkoop, D. E. Ezekiel, R. H. Buck and W. F. Reinhardt was appointed to meet with the California delegation in their special car at the Union depot this evening and discuss the question. The gentlemen of the California delegation were unanimous in their statements that from what knowledge they had the mining interests of this State are in a very prosperous condition."

I might have up our local market to quote some of the Colorado stocks, but we doubt it. If we know no more of them than they do of ours, there would be some fun in the business anyhow.

The Comstock pay-roll for the month of January amounted to \$126,683.58, showing a decrease over that of December of about \$13,000.

The following shows the standing of the various mines for the past month:

Dr.	Cr.	Dr.	Cr.
ARIZONA MINES.		Bullion	
Crocker	190	Caledonia	865
Peer	31	Challenge	3,282
Peerless	1,118	Chollar	3,788
Silver King	1,213	Imperial	6,342
BODIE MINES.			
Bodie	3,562	Co. Cal. & Va.	58,882
Bulwer	3,261	Co. New York	19,790
Mono	3,128	Crocker Point	2,784
Standard	4,17	Eschscholtz	2,291
Synthetic	1,248	East Sierra Nev.	6
Summit	1,759	Gold & Curry	11,787
TUSCARORA MINES.			
Dee	4,631	Hale & Norcross	17,823
Copple	1,800	Justice	1,793
Commonwealth	26,808	Kentuck	2,813
Del Monte	23,732	Lady Washington	5,217
Grand Prize	470	Morgan	9,333
Independence	5010	Overman	11,850
Nevada	102	Oce dental	3,978
Nevada Queen	6,926	Potosi	30,155
North Belle Isle	1,400	Savage	8,184
N. Commonwealth	1,400	Savage	8,184
CONSTITUTION MINES.			
Alpha	7,897	Seg. Belcher	11,160
Alfa	13,279	Silver Hill	1,876
Andes	906	Sierra Nevada	8,833
Belcher	2,247	Union	1,254
Best & Belcher	2,247	Union	1,254

NOTE.—Eschscholtz owes \$2500 on pumping account. Alpha owes \$2500 on pumping account. Kentuck has \$4622.34 in unsold bullion.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JAN. 31, 1893.	
490,892.—WOOD WATER-PIPE—M. D. Arms, San Diego, Cal.	
490,945.—ELECTRIC BELT—J. W. Cummings, Gold Hill, Nev.	
490,802.—LEMON-SQUEEZER—Dunham & Middekauff, Stockton, Cal.	
490,804.—VEHICLE AXLE GADE—T. H. Edwards, Latrobe, Cal.	
491,012.—BICYCLE BELL—L. E. Erickson, S. F.	
490,955.—SAFETY VALVE FOR WATER-GAGES—J. Fishburn, Walla Walla, Wash.	
490,874.—HORSE-HITCHING DEVICE—Fisher & Priestly, Stockton, Cal.	
491,062.—TROUSERS-STRETCHER—L. O. Granger, S. F.	
490,807.—GRAIN-SAVING DEVICE—G. W. Ingerson, Stockton, Cal.	
490,849.—CONCENTRATOR—Geo. Johnston, S. F.	
490,850.—CONCENTRATOR—Geo. Johnston, S. F.	
491,021.—EAG PUZZLE—E. Niehoff, Tacoma, Wash.	
490,822.—CAM—G. Pareho, Sierra City, Cal.	
490,984.—ROPE-LEADER FOR WINDING DRUMS—N. H. Pine, Eureka, Cal.	
490,792.—FABRIC TURFING IMPLEMENT—A. F. Pugh, Palouse, Wash.	
490,834.—GATE HINGE—A. O. Quinly, Fresno, Cal.	
490,725.—ELECTRICAL PRESSURE INDICATOR—E. G. Smith, San Jose, Cal.	
490,991.—STEP-LADDER—S. R. Smith, Colusa, Cal.	
491,033.—ORCHARD PLOW—Winston & Throop, San Gabriel, Cal.	

The following brief list by telegraph, for Feb. 7, will appear more complete on receipt of mail advices:

California—John S. Biggan, Whitesboro, gas engine; Charles E. Blake, San Francisco, surgical forceps for dental use; John H. Griswold, Oakland, combined fruit-picker and pruning implement; Mark A. Hart, Scribner, suspended chair; Jacob H. Kaufman, Marysville, adjustable map or chart stand; Peter and J. St. Mary, San Francisco, damper regulation apparatus; Peter L. Youngren, Oakland, continuous k'n.	
Washington—Gilbert D. Harton, Snohomish, fly-catcher; James Jett, Walla Walla, lawn-sprinkler.	
Nevada—Rachel A. Sheppard, Virginia, sewing-machine attachment.	

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, Feb. 2, 1893.

100 Alpha	20c	200 Kentuck	20c
700 Best & B.	1.45	200 Mexican	1.85
450	1.50	100 Overman	1.50
150 Belcher	.75	50 Ophir	2.10
200 Bodie	.15	50 Potosi	1.40
200 Con. Cal. & Va.	2.70	400 Sierra Nevada	1.35
500 Gold & Curry	1.45	500 Union	1.10
1000 Hale & Norcross	1.31	500 Yellow Jacket	.65c

2:35 P. M. SESSION.

450 Ophir	2.15	100 Con. Cal.	1.75
950 Mexican	1.80	200 Bullion	.65c
800 Gold & Curry	.95c	400 Belcher	.75c
50 Best & B.	1.45	100 Overman	1.50
100 Con. Cal. & Va.	2.65	150 Union	1.10
200 Savage	1.15	100 Yellow Jacket	.65c
100 Chollar	.80c	200 Alta	.20c
300 Crown Point	.60c	100 Caledonia	.70c
300 Potosi	1.40	200 New York	.45c
400 Yellow Jacket	.65c		

MINING SHAREHOLDERS' DIRECTORY.

COMPILERS EVERY TUESDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada	10	10c	Dec 20, Jan 24, Feb 14		O E Elliott, 309 Montgomery
Andes S M Co, Nevada	39	25c	Jan 21, Feb 24, March 16		J W T-jess, 309 Montgomery
Bainbridge Placer & Gold M Co, California	1	40	Jan 28, March 8, April 5		C L George, 419 California
Belcher M Co, Nevada	45	5c	Feb 8, March 14, April 4		C L George, 419 California
Belle Isle M Co, Nev	17	10c	Jan 9, Feb 14, Mar 8		J W Pew, 310 Pine
Best & Belcher M Co, Nevada	53	25c	Jan 15, Feb 21, March 14		L Osborn, 309 Montgomery
Caledonia M Co, Nevada	45	10c	Jan 28, March 2, March 23		A S Gorth, 419 California
Carr M Co, California	2	\$1	Dec 13, Jan 23, Feb 17		C S Coleman, 16 Fremont
Confidence S M Co, Nev	22	75c	Dec 24, Jan 26, Feb 15		A S Gorth, 414 California
Cora California and Virginia M Co, Nevada	3	50c	Dec 13, Jan 21, Feb 10		A W Havens, 309 Montgomery
Crocker M Co, Arizona	19	25c	Jan 16, Feb 21, March 15		A Waterman, 309 Montgomery
Crown Point M Co, Nevada	3	10c	Jan 6, Feb 10, March 3		J Newlands, Mills Building
Crocker-McKinnon M Co, California	3	10c	Jan 6, Feb 10, March 3		J Newlands, Mills Building
El Leopoldo M Co, Mexico	2	50c	Jan 24, March 2, March 28		J Howe, 214 Pine
Eschscholtz M Co, Nevada	35	10c	Jan 26, March 1, March 22		C E Elliott, 309 Montgomery
Gold Mountain M Co, Cal	4	25c	Jan 25, Feb 15, Feb 15		J F Ourtia, 323 Montgomery
Hale & Norcross M Co, Nev	103	60c	Jan 7, Feb 10, March 3		A E Thompson, 309 Montgomery
Independence M Co, Nevada	18	50c	Jan 27, March 6, March 20		J W Pew, 310 Pine
Jackrabbit M & M Co, Nevada	2	50c	Dec 29, Feb 6, Feb 28		T Wetzel, 320 Sansome
Justice M Co, Nev	1	10c	Jan 6, Feb 8, Mar 2		R C Kelly, 419 California
Martin White M Co, Nevada	28	10c	Jan 15, Feb 20, March 14		R L Koss, 120 Sutter
Morgan M Co, California	10	10c	Jan 28, March 0, March 30		A E Brown, 234 Montgomery
Navajo M Co, Nevada	24	10c	Jan 9, Feb 13, March 7		J W Pew, 310 Pine
Nevada Queen M Co, Nevada	8	10c	Jan 23, Feb 27, March 20		R R Grayson, 331 Pine
North Belle Isle M Co, Nev	2	10c	Jan 23, March 3, April 3		J W Pew, 310 Pine
North Commonwealth M Co, Nevada	1	10c	Jan 20, March 2, March 26		J W Pew, 310 Pine
Overman M Co, Nevada	66	25c	Jan 10, Feb 14, Mar 7		G D Edwards, 414 California
Pear M Co, Arizona	14	50c	Jan 20, Feb 24, March 21		A Waterman, 309 Montgomery
Peckham M Co, Arizona	11	25c	Jan 20, Feb 24, March 22		A Waterman, 309 Montgomery
Seg Belcher & Aldes M Co, Nev	11	25c	Jan 5, Feb 7, Feb 27		J W Pew, 310 Pine
Siakiyon Cons Quicksilver M Co, California	1	1c	Dec 16, Jan 20, Feb 10		E B Holmes, 309 Montgomery
South Eureka M Co, Cal	2	2c	Jan 4, Feb 10, Mar 6		A Halsey, 333 Montgomery
Weldon M Co, Arizona	6	50c	Jan 16, Feb 20, March 14		A Waterman, 309 Montgomery
West Cons Virginia & Cal, Nevada	1	25c	Jan 19, Feb 23, March 15		P H Anderson, 234 Pine
Yellow Jacket S M Co, Nevada	53	30c	Dec 6, Jan 10, Feb 14		W H Blauvelt, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Holmes M Co, Nevada	Annual	C E Elliott, 309 Montgomery	Feb 14
Nevada Water & M Co, California	Annual	D H Ward, 608 California	Feb 19
Pacific Coast Porax Co, California	Special	A H Clough, 103 Sansome	Feb 18
Quicksilver M Co, California	Annual	T W Hingham, 309 California	Feb 20
Watt Dine Gravel Co, California	Annual	G A Gorton, 323 Montgomery	Feb 20

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Holmer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzel, 310 Pine	Feb 19
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	23	D M Kent, 330 Pine	Dec 30
Pacific Coast Gravel Co, California	1	A H Clough, 103 Sansome	Jan 10
Standard Cons M Co, California	10	J W Pew, 310 Pine	Dec 23

Manufacture of Oil Gas.

A paper by James B. Ball, read before the students connected with the Institution of Civil Engineers, describes the manufacture of oil-gas at the Holladay Works, of the Great Northern Railway Company. Pintsch's system of gas-making is employed, and the works have been designed to produce about 60,000 cubic feet of gas per day. In each retort house, contained in 4 benches are 8 pairs of 10-inch D-shaped retorts, 6 feet in length, made of one-inch metal. The pairs of retorts are placed vertically over one another, and are connected by cast-iron mouth-pieces on the opposite ends to those at which the oil is delivered; doors being provided in the mouth-pieces for cleansing purposes. In each upper retort is placed a small sheet-iron tray about 2 1/2 inches deep. This tray becomes coated with carbon after a short time, and is changed and cleansed once a week, and renewed after about three months' use. Stouter trays made of steel are now being tried, and promise to prove much more durable.

The gaseous vapor generated in the upper retort passes down through the mouth-piece into the lower one, and at the other end through a short vertical pipe into the hydraulic main. The retorts are set in specially-made fire-clay blocks, and on both sides small sight-holes are formed at the furnace end, with the object of ascertaining and regulating the temperature. They are kept as nearly as possible at a cherry-red heat; but the lower one, being immediately over the furnace, is generally at a higher temperature than the upper one; and this extra heat is beneficial in thoroughly gasifying the vapor before it passes into the hydraulic main. Each pair of retorts will make between 600,000 and 700,000 cubic feet of gas before they require to be taken out and renewed, the old retorts being broken up and partly used again for new castings.

At the bottom of the lower retort, immediately before the gas enters the hydraulic main, is a three-fourths inch iron pipe tapped into the retort and provided with a stop-cock, by means of which the color of the gas may be seen, this being the practical test applied to ascertain the quality of the gas, and whether the proper quantity of oil is being admitted into the retorts. Another test for regulating the supply of oil is to drop a small quantity of the tar from the gas main upon a sheet of white paper. Should too much oil be admitted to the retort, a greasy ring will be found around the spot of tar. If the right quantity is being used, no greasy ring will appear. Below the stop-cock, and tapped into the three-fourths-inch pipe, is a one-fourth-inch pipe, which is carried to the wall of the building and attached to an ordinary water-gauge which registers up to a head of 12 inches. Each pair of retorts is provided with a separate gauge, and the working-head, which is usually about 3 1/2 inches in the retorts, can be thereby observed.

The furnaces are situated immediately under the retorts, the bottoms being formed by three 1 1/2-inch round cast-iron fire-bars three feet in length, resting upon three cast-iron cross-bearers. This arrangement permits the fires to be easily cleansed from

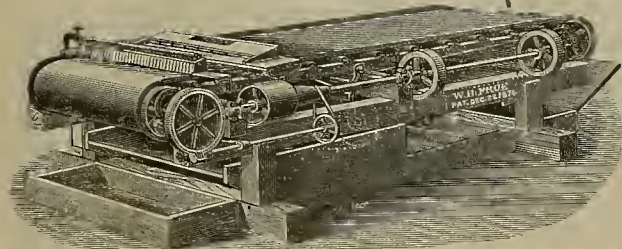
clinker and ash, and the fire-bars to be renewed without trouble. Immediately below the fire-bars is an ashpans which is kept full of cold water. The furnaces are arched over with fireclay blocks, upon the flat crown of which the lower retort is seated. Three four-inch by three-inch openings or flues are formed in this arch on each side of the retorts, which are protected by a thin lining of fire-brick to a height of five inches. A clear space of two inches is left between the crown of the lower retort and the bottom of the upper one, which is thus fully exposed to the heat and smoke ascending from the furnace. Two small flues are formed on each side of the upper retort, and a semi-circular arch is turned over at two inches clear of the crown. In the center of this arch an opening ten inches square communicates with a semicircular chamber extending the full length of the retort; and flues are brought over from all of these chambers into a center shaft nine inches square inside and carried up through the roof. The whole structure of the setting is held together by angle-irons at the corners with through bolts. Notwithstanding this, it becomes more or less cracked after a little use, for the working of the retorts produces an expansion of 1 1/4 inches at each end.

When in proper working order, each pair of retorts produces on an average between 300 and 400 cubic feet of gas per hour, and the furnaces consume between 160 pounds and 180 pounds of coke for every 1000 cubic feet of gas produced. The setting to the retorts is arranged so that a minimum of work in pulling down and rebuilding is required when new retorts are inserted.

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GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l Supt. FRENCH GULCH, Calaveras Co., Cal., Dec. 12, 1891.
 MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been \$60 small mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six-foot Frue Vanner too highly, and it is the only table that I would have in my mill.
 C. J. CLARK, Gen'l Supt.

For any information, or for pamphlets, or for circulars or testimonials, call on or address

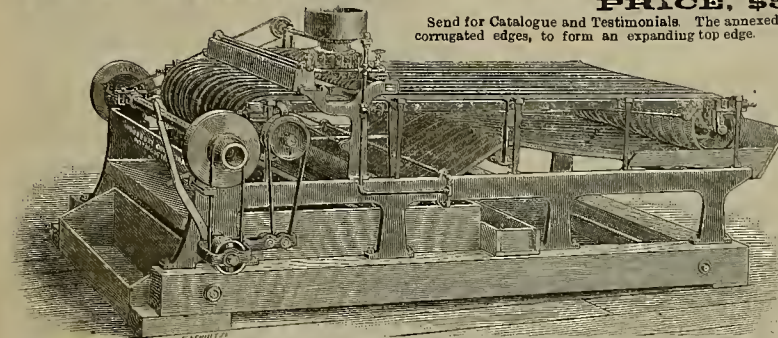
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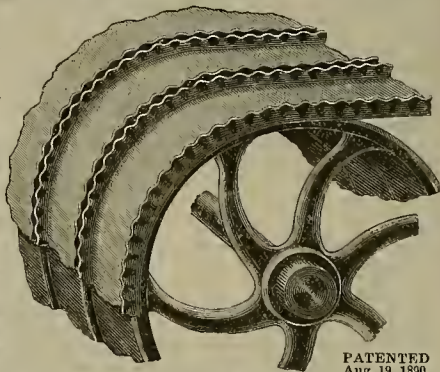
THE SAN JACINTO ESTATE—Office of the General Manager. CALIFORNIA, Oct. 30, 1891.

GEO. E. WOODBURY, Esq.—Dear Sir: In reply to yours of the 27th inst., respecting the working and efficiency of the "Woodbury" Concentrator placed in our works by you, I am pleased to inform you that it is giving entire satisfaction, it has a much greater capacity than any other machine, and is doing fully one-third more work, with the concentrates equally clean, as from either of the machines at work here.
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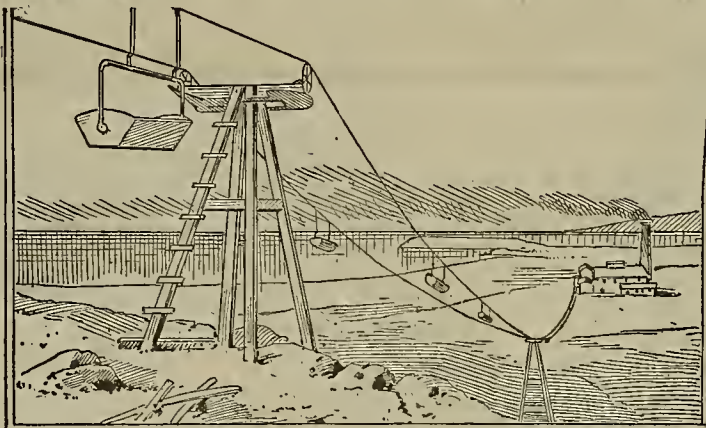
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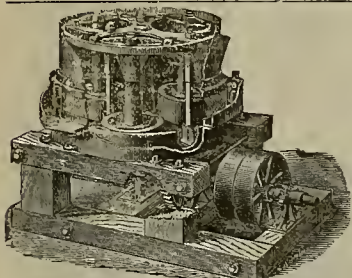
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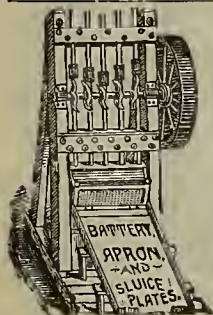
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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVI. — Number 7.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 18, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Battle-Ship Oregon.

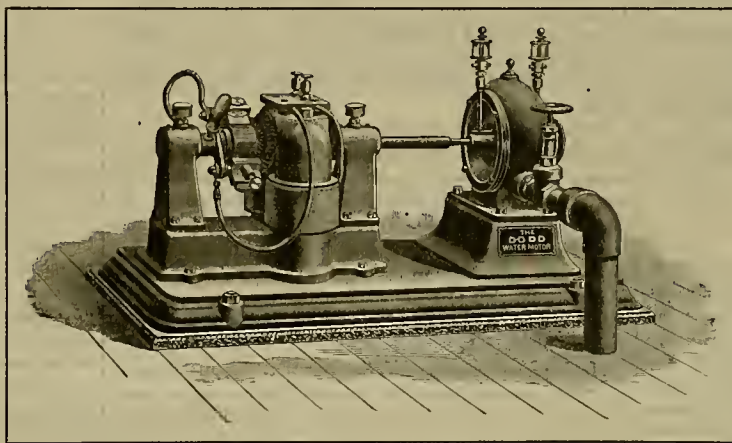
One of the largest modern ships of war yet attempted by our Government is the battle-ship Oregon, now in course of construction at the Union Iron Works shipyard in this city. This vessel is to have a displacement of 10,000 tons, and her principal dimensions are: Length, 348 feet; breadth, 69 feet 3 inches, and depth, from keelplate to superstructure, 42 feet. She was contracted for under the Naval Construction Act, passed by Congress, June 30, 1890, and is to cost, exclusive of armament, nearly four million dollars. The minimum speed to be maintained for four consecutive hours is to be not less than fifteen knots. The hull is to be of steel, not sheathed. Her framing will be on the bracket system, and she will have a double bottom extending from armor-shelf to armor-shelf, and forward and aft. The armor on her sides, for protecting the water-line, will have a maximum thickness of not less than eighteen inches, with a mean depth of seven feet, and the transverse armor at the ends of the belt-line will not be less than seventeen inches thick. The sides, from armor belt to main deck, will be protected by not less than five inches of steel armor. Coal is to be carried back of this casemate. An armored deck, not less than three inches in thickness, will extend forward and aft from the ends of the armor belt, being curved down on each side to meet the side of the ship below the water-line. Over the side armor belt this steel deck will be not less than two and three-quarters inches in thickness. The Oregon will have an approved water-excluding material equal to woodite or cellulose, fitted along the sides, forward and aft, on the slopes of the three-inch protective deck.

She will be supplied with powerful guns, aggregating in all six hundred and thirty-one tons. They will include four 13-inch breech-loading rifles, weighing sixty tons each, with their mounts, shields and equipments; four 8-inch breech-loading rifles; four 6-inch breech-loading rifles; sixteen 6-pounder rapid-firing guns; six 1-pounder rapid-firing guns, and two Gatlings, with all necessary mounts and shields therefor. It will require 306 tons of ammunition to complete the vessel's fighting outfit.

Her 13-inch guns will be protected by 17 inches of armor. The axes of these guns are to be not less than six feet above the deck, and due regard must be paid to interference of fire and the effects of the blasts of the various guns. The six and eight inch guns will be protected by shields and, in addition, by barbettes or otherwise, carrying four-inch armor for the six-inch guns, and six-inch armor for the eight-inch guns. The ammunition for the eight-inch guns will be supplied through armored tubes.

The Oregon will carry twelve torpedoes. There will be seven above-water torpedo tubes—two forward, one aft,

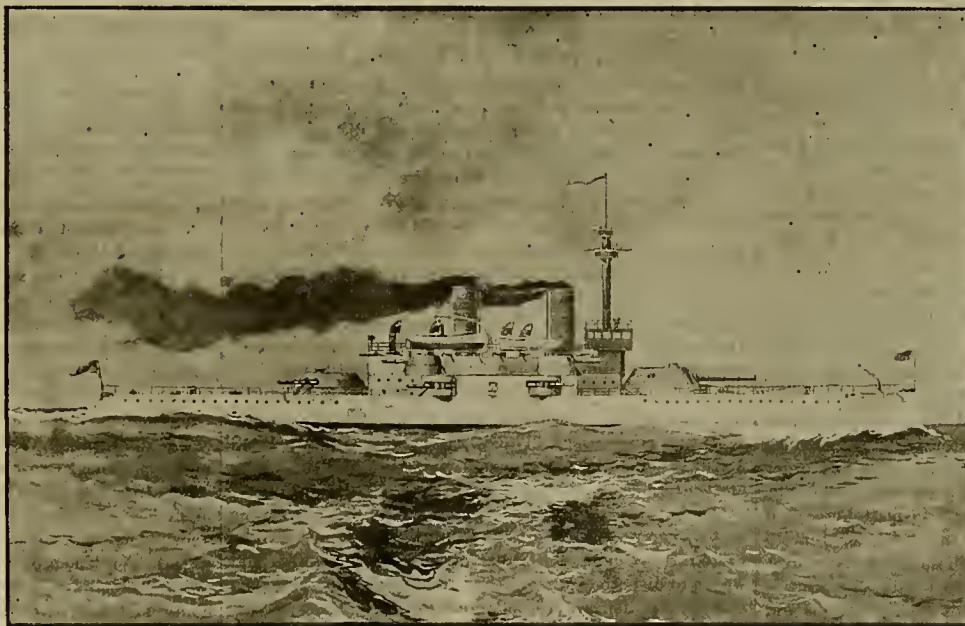
and two on each side. She will also carry a distilling apparatus, which will supply fresh water; the allowance of of water to be carried is to be enough to last fifteen days, besides water for sanitary purposes. The vessel will have a complete electric light plant. This will be the fifth of the war vessels built at the Union Iron Works, and is the heaviest and most important one. The last one finished—



COMBINED WATER-WHEEL AND DYNAMO. (See page 99.)

the Monterey—went into commission this week at Mare Island.

Cruiser No. 6—the Olympia—is, like the Oregon, in course of construction at the Union Iron Works, and



THE UNITED STATES BATTLE-SHIP OREGON.

is being pushed to completion as rapidly as can be done by the large force employed upon her.

ADVICES from the Coeur d'Alene silver and lead mining district in Shoshone county, Idaho, are that owing to the low price of silver the mines will within a few weeks be compelled to shut down. This action will throw about 2000 men out of employment and will have a disastrous effect upon northern Idaho.

California Iron.

The Jones Creek iron mine, half a mile from Humboldt bay, Humboldt county, has been leased to Eastern parties, who intend to open and prospect the deposit. Should developments justify, a furnace will be put up. The ore is a red hematite. It is sincerely to be hoped that experienced Eastern men have this matter in hand and will make a success of it. We very decidedly need iron here which is not so expensive as that brought thousands of miles by sea or rail. Some of the Shasta county iron ore is being used by the Union Iron Works of this city, and is found satisfactory. An iron mining property on Humboldt bay would have the advantage of sea transportation both for obtaining its fuel and for shipping its products. There are, however, in the same county, on Willow creek, some coal deposits now being opened. If the coal is found to be suitable, it may be used in conjunction with the iron-smelting plant.

That cheaper iron is an actual necessity in California is shown by the petition recently sent by the iron foundry and manufacturers of this city asking for a removal of the tariff on this substance. Most of what we consume here now comes from abroad

and pays duty. Some comes from the East, but high railroad rates make this expensive also.

The deposits of iron ore in Shasta county are very extensive, but there is no good coal near by with which to smelt it. There is coal up on the Pitt river which might be utilized for making gas, but notwithstanding the efforts of the people here, they have been unable to obtain capital to develop the properties and start up a plant. One trouble is, there is only one line of railroad in that section, and there would be no guarantee of continued low freights to this city, which would be the principal point of consumption for the product. There are few people here experienced in working iron mines. It would take Eastern men to make a success of such a project. The Shasta iron itself is of very fine quality and, it may be said, there is practically no limit to the quantity. Either the Humboldt or Shasta deposit, systematically worked on a large scale, would exercise a most important influence on our local manufacturing industries.

IDAHO yielded last year \$7,703,000. Of this the silver amounted to \$2,798,000, lead \$2,575,000, and the balance was gold. This is a decrease of \$1,936,000 from the output of 1891. The decrease is due to the shutting down of many mines in the Coeur d'Alene and Wood River regions.

ALL the principal mines at Tintic, Utah, are closed down, the miners employed having refused to submit to a reduction of wages.

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Our latest forms go to press on Thursday evening.

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San Francisco, February 18, 1893.

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Comment.

The Acting-Assistant Treasurer of the U. S. Sub-Treasury in New York, M. L. Muhleman in figuring up the the amount of gold and silver in the world on the 1st of January, makes the two metals come out even. The aggregate of gold is \$3,900,000,000, and silver exactly the same. India and China have the most silver, \$1,700,000,000, and France the most gold, \$1,000,000,000. The latter country also has the most silver, except India and China combined, the amount being stated at \$700,000,000. The United States is credited with \$650,000,000 in gold and \$590,000,000 in silver. According to these figures, with the two metals, France has in gold and silver \$1,700,000,000, which is exactly the amount India and China have in silver. The United States comes next in order in total amounts of the combined metals, having in fact more of each precious metal than all other countries, except France and India and China. A great deal of the gold seems to be drifting away from this country, however, especially of late. It is interesting to note, as to local conditions in this connection, that some months ago the San Francisco sub-treasury sent \$20,000,000 in gold East, and there is still in this city in that institution \$27,000,000 in gold. The leading commercial banks here have also plenty of coin. The surplus of coin on hand in these banks and that in the savings banks is very large, and rates to borrowers are easy, with every prospect of continuing so. In fact, there is too much unemployed money here for the good of trade, and holders would gladly have some outlet for it.

Senator Langford this week introduced two bills, one to abolish the State Mining Bureau, and the other relating to the division of swamp-land districts. With the latter subject this gentleman should be familiar, since he is from San Joaquin county, but with the Mining Bureau affairs he should have nothing to do. Senator Langford's county has more swamp lands and less mines than any other county in the State. This being the case, the Mining Bureau is of little or no value to him or his constituents, and it would be more graceful, to say the least, for him to leave that institution to the care of those in whose interest it was founded. None of the men from mining counties care very much for the various agricultural institutions and bureaus now maintained by the State, but they do not interfere with them, supposing the agricultural communities know best what they want. Senator Langford might exercise similar discretion and not meddle in a subject which concerns him so little. The Governor himself is of the opinion that the miners' representatives should attend to any changes which may be needed to improve the Mining Bureau—an opinion that the public generally will share.

The legislature is actually considering a proposition for county surveyors to prepare plans and specifications superintend the construction, and repair and maintain all county roads. They are to advise with supervisors as to

bridge construction and repair and be paid by the day instead of by fees. The bill has the endorsement of the Technical Society of the Pacific Coast, and was framed at the convention of county supervisors, who are represented in Sacramento by J. L. Maude of Riverside. The object of course is to do away with the generally incompetent road overseers and put a skilled engineer in charge of such work, taking the supervision out of the hands of supervisors or politicians. It is a move in the right direction but a radical change in the system almost too great to expect. To be sure intelligent expert work would greatly benefit all county roads and be a boon to people all over the State. The adoption of the measure would add to the duties of the county surveyors, but they are permitted to employ skilled deputies to assist them. Road building is a branch of the engineering profession which will be of more importance in the future as the country is thoroughly awakened to the necessity of better roads.

The State University and the Mining Bureau.

We have received a copy of the bill introduced in the Assembly by Mr. Kennedy, who originated the measure Senator Langford fathers in the Senate for abolishing the State Mining Bureau. It provides for a continuance of the Mining Bureau museum in San Francisco as at present, except that it is to be managed by the State University. The museum, library, laboratory and all other property of the Bureau is to be turned over to the University; and the Regents may authorize the Department of Geology and Mineralogy of the University to carry out any investigations in the field or otherwise which may be deemed necessary for the elucidation of the geology and mineralogy of the State.

With the copy of the bill comes also a circular giving the author's reasons for the passage of the bill. In this he speaks of the failure of the Bureau as a practical and scientific institution; its inadequate return for money expended; the impossibility of accomplishing geological and mineralogical results in a Bureau hampered in its appointments and operations by political conditions; duplication of work from year to year; uselessness of maintaining the office of State Mineralogist should no money be appropriated for field work.

Mr. Kennedy states in his circular that the bill does not imply the termination of the work of the Bureau—simply its transfer to the University, where it would be carried on in a more practical and scientific manner in the extensive laboratories. He thinks this would encourage the beginning of a systematic study of the geology and mineralogy of the State. The connection of the fieldwork in geology and mineralogy with the University would give opportunity for advanced students in mining and allied branches to spend their vacations in the study of the geology of the whole State. This would establish a practical school of geology and mining such as has been found useful in other countries.

With all due deference to Mr. Kennedy's opinion, the whole plan seems to us impracticable. The functions of the Mining Bureau and the Department of Geology and Mineralogy of the University are totally different. If it is desired to abolish the entire Bureau, with the exception of the museum collection, the bill will answer the purpose; but no Bureau need be maintained to give advanced University students opportunity to spend their vacations studying geology. They can do that without any Bureau.

The study of geology and mineralogy is of slight moment to a Mining Bureau, while it is important to those attending a University Mining Department. The U. S. Geological Survey can give us all the geology we need. One geologist connected with the bureau will know every practical purpose as far as the money interests are concerned. One skilled mineralogist to determine specimens, is all that is necessary. The way to make a mining bureau useful to the mining public is to make it a bureau of general information. Very few miners ask questions about geology or mineralogy. They want to know however, the best way to work their ores and to utilize their mineral deposits; the commercial value of mineral substances and where to dispose of them; the class of machinery or mechanical appliances best adapted for their needs; comparative merits of processes; the statistics and technology of the mining business, etc.

That the Bureau has in a measure failed to satisfy these requirements must be confessed, but there is no reason why it can not be made to do so. It would be better to rehabilitate it on a proper basis than to abolish it. Turning it over to the university practically abolishes everything connected with it except the museum, and even that could be reduced one-half in size without injury.

The University is not equipped to properly maintain such an institution as this. It has not itself achieved any very remarkable success or become famous in its Mining Department. It never publishes any of the results of its

works for the benefit of California miners. The personal investigations of the Professor of Mining are usually published in New York by an Institute of Mining Engineers, when published at all. There are no bulletins from the Mining Department as there are from the Agricultural Department. Whatever is done at the University is kept at the University; the public knows nothing of it whatever. When the students in the Mining Department pursue an investigation of value, they want to be paid for giving an account of their work to the press.

In order to handle the business of the State Mining Bureau, the force in the Department of Mining of the University would have to be greatly enlarged and a different system pursued. The functions of that department would be changed. The Regents of the institution have no reputation for progressiveness, nor do they seem to be in close touch with the public. As the management of the Mining Bureau would be in their hands under Mr. Kennedy's bill, the mining public would be worse off than they are under present conditions.

We can see no merit whatever in the proposition. It looks more like an absolute attempt to kill the Bureau than to remodel it. The Mining Department of the University is educating the students who attend it, and doing good work in that direction; but when the whole business of a Mining Bureau is thrown on its hands, the department will have more than it can properly care for. There should be a separate institution or none at all.

The Conference Agrees to the Mining Bill.

The main topic of interest to the California mining community just now is the probable fate of the Caminetti hydraulic-mining bill, which has been so long pending. From present appearances the bill will become a law in a few days, with the objectionable penalty clause modified as the miners desired it to be. Senator Berry of Arkansas, a relative of C. P. Berry of this State, was bound up in some kind of a cast-iron promise to permit no change in the bill, and would listen to no argument, so the conference committee could do nothing. It was represented that if C. P. Berry would give his consent, the amendments might prevail and the bill be reported favorably by the conference. Thus one individual—an antidebris representative—blocked a bill for the ostensible rehabilitation of hydraulic mining. When the whole responsibility was thrown upon this man he finally telegraphed to Senator Berry that the valley people had no objection to the addition to the penal clause of the Caminetti bill of the following words: "Directly or indirectly injuring the navigable waters of the United States."

On Wednesday of this week, the conference committee came to an agreement, and the Senate bill was amended. Senator Berry received another telegram from his cousin advising him to agree to the proposed amendments, so there was no more opposition. The penal clause of the bill, as agreed upon by the conference committee, now reads as follows:

And any person or persons, company or corporation, their agents or employees, who shall mine by hydraulic process—directly or indirectly injuring navigable waters of the United States—in violation of the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding \$5000, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court.

It is provided that this section shall take effect on the first day of May, 1893.

The words "relating to the working of hydraulic mines" are inserted in Section 24, so as to permit consultation with the Debris Commission, provided the legislature of California passes the bill now pending creating such commission. These are the most important changes resulting from the refusal of the House to concur in the Senate amendments.

The Washington dispatches are somewhat "mixed," as both Felton and Caminetti are reported in receipt of telegrams from the Executive Committee of the Miners' Association consenting to accept the amendment unchanged. This is incorrect, since no such dispatches have been sent to these gentlemen by the committee. In fact the association sent Judge Searles on specially to get the penal clause modified, as it has been. Mr. Caminetti appears to be making a little political capital by referring to the "kid-glove Sunday miners of San Francisco" and saying he did not approve the bill with original penal clause, while they demanded that he accept the bill.

He may have dreamed this, but has no better basis for the statement. The committee has not met of late, and when it did, sent no telegram to Caminetti or Felton. Individuals may have telegraphed their personal opinions, and this is probably what brought forth the statements in the dispatches. Mr. Caminetti, however, has no right to place the Executive Committee in a false light. The whole record will show that the committee fought for the amendments, and Mr. Caminetti himself was afraid they

were endangering the bill. Mr. Caminetti's statements may give him some brief "glory" as doing it all himself; but the apparent attempt to belittle the Miners' Association is silly, to say the least.

Combined Water-Wheel and Dynamo.

Our engraving shows a combination made by Mr. Dodd of the Union Iron Works, consisting of a Dodd Sigmoidal water motor and a Keith electric-light dynamo mounted on a base common to both. This engraving is made from a photograph of a machine used by Mr. Llewellyn at San Rafael, Cal., for lighting his residence by incandescent electric lamps. Besides being a very sightly piece of apparatus, it is more compact, and utilizes the power of the waterfall to a greater degree than if the dynamo were driven by a belt from the water motor.

This combination is made in all sizes by both the Union Iron Works and the Electrical Engineering Co., in San Francisco. It is especially advantageous in the lighting of mining works wherever water for tangential wheels is available. In the larger sizes, the combination on one base of an iron-encased wheel and electric generator, for power transmission, is the most simple arrangement imaginable for the purpose.

Mining Briefs.

ANTIMONY is selling in Liverpool at £42 to £42 10s per ton.

SOME excellent asbestos deposits have been found in the Grand Canyon district, Arizona.

THE demand for sulphate of copper has fallen off in England, and £15 10s to £15 15s is now the value.

THE United States sent abroad last year a great deal of copper. To England we sent 25,587 tons, and to France 2430 tons.

"FREE COINAGE OF SILVER," by John C. Henderson is the title of a paper highly spoken of by Senator Stewart, which will appear in the March *Overland Monthly*.

A SMELTER is being built at Pedrixna, north of Durango, Mexico. The promoters are C. P. Huntington, president of the Southern Pacific Co., and the Omaha and Grant Smelting Co., of Denver and Omaha.

THE Providence Mining Co., of Nevada county, is about to ship 100 tons of sulphurets to the Selby smelting works, but intend to put up their own chlorination works and attend to the sulphurets at home in the future.

LIVERPOOL and Swansea received last year from Chile 17,619 tons of copper, while from this country 25587 tons were received. Spain beat Chile last year, sending to the cities named 4910 tons of copper and 14,831 tons of precipitate.

SAN FRANCISCO exported by sea last month 3208 flasks of quicksilver worth \$133,260. Most of it went to New York. During January there were 2243 flasks of quicksilver received at this port, as against 1704 for the same month in 1892.

SALT LAKE CITY has raised a sum of \$100,000 in money and 160 acres of land as a bonus for the copper refinery to be erected by Posey & Green. Butte, Omaha and Chicago were competing for the plant, but this bonus is expected to bring the refinery to Salt Lake.

THE Nampa *Progress* says the excitement over the recent discoveries of precious stones in the Owyhee country, Idaho, has not abated. They may do something with their opal mines up there, but with the diamonds and rubies it is more than doubtful if any success is made.

AT the annual meeting of the Cape Copper Company, the chairman stated that 5670 tons of copper in ore had been raised during the year 1892, at a cost of 5s 2½d per unit, against 5100 tons in 1891 at a cost of 6s 4½d per unit, the profit being £61,000 in 1892, against £69,744 in 1891.

THE Salt Lake *Tribune* learns that 1,000 men are out of employment at Eureka, Utah, most of them on account of reduction in wages. A warning has been issued against nonunion laborers coming into camp. There is a great depression in the camp in consequence of the stoppage of work.

THE Deadwood *Pioneer*, speaking of the shut-down of the Harney Peak Co's tin mining operations, says that the mill was not in operation long enough to practically demonstrate the commercial problem of tin mining in the Black Hills. The *Pioneer* still believes that, with proper management, there are a number of tin mines in the Black Hills that will pay a reasonable interest on the investment.

FELIX KNIGHT who died at Pioche on the 4th, has for the past 20 years or more lived for the most part of the time alone in Silver Park district, working his silver mines and only making a shipment of ore when supplies were short. He wielded a large hammer with one hand and did quite as much execution as an ordinary man does with two. A few months ago he refused \$80,000 for his mines in Silver Park district.

THE State authorities at Sacramento are having the usual trouble adjusting the income of the State to the enormous demands on the public purse. Various State institutions, State officers and others who think they have a claim on public consideration, have already asked appropriations aggregating \$15,287,177 for the two years beginning July 1, 1893. The estimated income of the State, on a five-mill tax basis, will be about \$12,758,325 for these two years. It is plain that the squeezing process will have to be resorted to. No doubt many of the appropriations asked have no merit, while others can safely be reduced.

Coast Industrial Notes.

THE Los Angeles cable roads and electric roads are to consolidate in one company.

THE work on the new electric road on Twelfth street, west of Broadway, Oakland has been fairly started.

THE Southern Pacific has commenced track-laying at Santa Margarita toward the big tunnel. No water has been encountered in the tunnel work, and the big bore is progressing rapidly.

BETWEEN Niles and Decoto, Alameda county, is a bed of molders' sand, which is added to year after year by the wash from Alameda creek. This deposit is a very valuable one indeed, and yields a handsome revenue yearly to its owner.

THE new electric-light works, which will give light to Yuma and the new town of Yuma Heights, started up on the 13th and are running. The old town, so completely wrecked by the flood of two years ago, has arisen from the ruins, and has new water works and electric lights.

THE big reservoir at La Mesa, San Diego county, projected by the flume company will be begun at once, the contract having been let to Joseph Nickerson, who is to complete the work within 60 days. The dam will be 30 feet high, 278 feet long, and will impound 19,000,000 gallons of water.

THE new electric steamer built by Stacy Bros., was successfully launched at Yuma on the 13th inst. She will be used in the ore and mining trade between Yuma and the mines on the Colorado river. She is the largest boat ever built to be propelled by electricity. She will carry 50 tons on 20 inches of water.

A COMPANY is about to erect a plant in the vicinity of Los Gatos with which to concentrate the juices of fruits, berries and grapes. The evaporation is accomplished by the well-known film process, which consists of exposing a thin film of juice to rapidly-moving currents of warm air, precisely on the same principle as that used in evaporating cut fruit.

THE former machine-shop in the department of construction and repair at Mare Island navy yard is being fitted up for a toolroom. A second floor is being laid, and on this floor will be several partitions for use as offices and special purposes. One partition of the lower floor will be used for the molders in case sufficient funds are obtained to make other necessary improvements.

REPRESENTATIVES of a company of wealthy San Francisco business men, who are heavy owners in Nevada county gold mines, are in Nevada city making preliminary arrangements for constructing an electric railroad from that city to Marysville, 40 miles distant. The projectors promise that the line will be pushed through during the coming summer to Grass valley and will be completed the entire distance before 1895.

THE Board of Supervisors of Santa Clara county has granted three electric-railway franchises—one to Jacob Rich for a road from San Jose to Willows; another to J. H. Henry and J. P. Burke for a road to Meridian, and a third to F. M. Smith, Warren Olney and others for a road to Saratoga, 11 miles distant. Previous efforts for a road to Saratoga had failed, but the people rejoice that a road is to be built. It will carry both freight and passengers.

SOME of the new electric roads in Oakland are putting their curves very close to the corners of the streets. The Hayward Electric Company is now putting in a curve at the corner of Thirteenth and Washington streets. It is one of the sharpest curves in the city and comes within two feet of the sidewalk. Abrahamson Brothers, who own the building on the corner, have entered a vigorous protest against the work and have appealed to the Board of Public Works.

THE new wharf being built at Santa Monica by the Southern Pacific Co. has now attained a length of 4000 feet and will be built about 850 feet farther into the ocean. The portion now being constructed is about 130 feet wide and will accommodate seven lines of track. Coal bunkers 800 feet in length will be built in the portion of track not yet constructed. At the present sea end of the wharf the water at low tide has a depth of 38 feet. There will be a depth of 45 feet at the outer end when completed.

THE statement is made that the United States imports nearly a million gallons of olive oil, while California manufactures as yet but 11,000; that foreign pickled olives sell at \$4 a gallon in small bottles, while excellent California olives retail at \$1 a gallon from the barrel. This is reason enough for the cultivation of the olive and the manufacture of oil in Southern California, but the business requires the intelligence and persistence demanded for the prosecution of any skilled branch of industry.

DURING the past few months the Oakland, San Leandro and Haywards Electric Railway Company has been cutting into the passenger business of the Southern Pacific Company very largely. The electric cars run every 20 minutes from Oakland to Haywards, so that the large majority of people now never wait for a train, but use the electric cars instead. The Southern Pacific has determined to enter into competition for passengers. It will in a few days run trains to Haywards every hour during the day, and the fare will be placed lower than that of the electric road. It will be a case of steam against electricity.

A SMALL LAUNCH ENGINE is now being made at the Mare Island Navy Yard for the United States Coast Survey steamer Patterson. Her old launch engines are also undergoing repairs. According to instructions from higher authority, very economical methods are pursued by her officers. All the small lathe work is being done on board of the ship, a small launch engine having been fitted temporarily for that purpose. The more particular machine work is turned over to the machinists of the yard their own machinists doing all of the vise work. It has often been the case when outside vessels came to the yard for slight repairs, most of the small work would be done

by the ship's machinists in the shops, much to the annoyance of the ship mechanics and the destruction of the tools. This will, however, not be done in the future to any great extent, as orders have been issued to the contrary unless under extenuating circumstances. In the manufacture of the launch engine for the Patterson, the shops are placed in direct competition with the Herreshoff people, and the engine is to be very similar to that made by them, except that it is not as simple in detail and involves much more labor. Considerable interest is felt in the outcome by the officers and mechanics.

THE Alaska Packers' Association, which was formed last week to control the salmon industry, has completed the organization of the company and elected all the officers. The offices of the company will be located at the corner of Front and Market streets and are now being fitted up. All the canneries in the scheme have received their pro rata of stock in the new association, and the plan of operation for the coming season will soon be decided upon. The object of the company is to curtail expenses and limit the output, and all Alaska canneries except two are in the pool.

THE Board of Directors of the Sacramento Box and Supply Company has organized by electing the following officers: W. F. Barnes, president; D. O. Mills & Co., treasurer; W. F. Cronmiller, secretary and general manager. The company succeeds the firm of W. F. Barnes & Co., and organized for the purpose of manufacturing and selling lumber, doors, sash blinds, grape and berry baskets, etc., has just completed a large two-story building at Twelfth and B streets, Sacramento, where it will give employment to a number of girls and boys in the basket-making department when the season opens.

A MEETING of business men of Fresno was held on Tuesday to consider the steps to be taken to raise the required bonus for the proposed Monterey and Fresno Railroad. Some thought the best plan would be for twenty-five men to subscribe \$20,000 apiece. Others were of the opinion that the public in general should be asked to subscribe. Committees were appointed to see to the right of way to this city—one to invite cooperation of the county Supervisors and the City Trustees in the matter of the right of way and another to stir up the colonists. Theodore Kearney proposed that the subscriptions be made part of the bonded indebtedness of the road with the understanding that they would have to be paid along with the other bonds should the road ever be sold or get into the hands of the Southern Pacific.

A CODFISH COMBINE has been perfected in this city under the name of the Union Fish Company, and last season's catch of codfish taken in the Behring and Okhotsk seas and cured at Lynde & Hough's station at California City and the McCollam Fishing and Trading Company's Station on Kashaw's island, opposite Saucalito, has been disposed of to the Union Fish Company. The two companies which form the combine retain their individuality to a limited extent, but will operate their vessels for mutual benefit. The reason given for the combine is that competition has put down the price of codfish to such a figure that the industry could not be profitably conducted so as to hold out against cheap and adulterated articles which are put on the market from the East. The codfish industry has been running down on this coast since 1883, when there were 17 vessels in the service. Last year there were only five or six schooners and barkentines. While the fish caught the last few years were of good size and excellent quality—showing that the banks in the Behring and Okhotsk seas were improving—competition in this city has nearly killed the industry.

SUPERINTENDENT BROWN, of the Carlson-Currier silk mills at Petaluma, does not believe that California women can reel silk from cocoons profitably. He says: "When the ladies of this city first organized the Petaluma Women's Silk Association, I told them we would purchase all the reeled silk they brought to us which would compare favorably with that which we import from China and Japan. In those countries a silkreeper is paid but six cents a day for labor, and silk cocoons are very cheap, while in California a silkreeper cannot be hired for less than \$1 per day, and the cocoons cost \$1.40 per pound. The reeled silk is not bulky, so shipping costs but little, and the duty on raw silk is very light. I cannot see how the reeling of silk can be made profitable in Petaluma. The ladies will be out of pocket a great deal in hiring somebody to teach them how to reel, and about the only thing that would keep them together would be Government appropriations. They have worked hard in their undertaking and have had all the advantages that could be expected. The railroads and newspapers have extended them many courtesies, and they are to be admired for their perseverance, but for my part, I do not believe in their staying with it any longer."

C. J. WETMORE of the viticultural commission has made the following estimate of the wine production of California during 1892:

	Gallons.
Napa county.....	2,500,000
Sonoma.....	2,750,000
Alameda.....	1,250,000
Contra Costa.....	300,000
Santa Clara.....	2,750,000
Santa Cruz.....	250,000
San Joaquin.....	300,000
Fresno.....	750,000
Los Angeles and South.....	500,000
Sacramento and North.....	500,000
Other counties.....	500,000

Total for State.....12,350,000

ABOUT a month ago the men who had been employed at Moody's wool warehouse, on Bluxome street, quit work because the owners wished to pay them \$2.50 per day, rather than 25 cents per 100 pounds. Girls were at once employed in their places. The employment of women for this work was an experiment that had never been tried in the California sorting rooms, and the mill owners watched the result very carefully, intending to make the same change should it prove a success. The change has been decided to be satisfactory and will help the demand for California scoured wools, as the wool is being more uni-

formly sorted. Catton, Bell & Co., when the season opens, will also employ girls exclusively. For a number of years S. P. McClellan has employed Chinese as sorters, but they will have to go, and the girls will succeed them. "I am thoroughly in sympathy with the change," said Mr. McClellan. "I have not employed Chinamen for any love of them, but simply as a business proposition. I buy my labor just as I would buy anything else, in the cheapest market, and I could get more work for my money by employing them. Now that the girls have demonstrated that they are able to do the work I shall put them into my place as soon as possible, and I am willing to pay them more than I have paid the Chinese if they do as much work and do it equally well." At other wool-sorting houses on Bluxome and Townsend streets the same change will be made. There will be employment for at least 250 girls when work is in progress in all the mills. Many applications for employment have already been received.

DREDGING in the San Antonio estuary, which forms part of the Oakland harbor, will be commenced next week by the Von Schmidt Dredging Company, under a subcontract with John H. Hackett, who, representing the Pacific Coast Dredging and Reclamation Company, has contracted with the United States Government to do the work. The terms of Hackett's contract with Von Schmidt are private, but those of Hackett with the Government are that he shall dredge the channel of the Oakland Harbor from Webster street westerly, in front of the city, to a depth of 20 feet at low water, along such lines as the Government engineer in charge shall direct. From this channel 250,000 cubic yards of spoil must be taken, and 40 cents a yard will be paid for the work. Another contract with Hackett is that he shall dredge the channel lying in front of Brooklyn to a depth of eight feet at low water, taking out 200,000 cubic yards at the rate of eight cents a yard. The difference in the rate for dredging is on account of the difference in the depth and quality of the spoil to be cut and pumped over the marshes by the hydraulic dredger. The Government will pay over \$124,000 for the work, and Alameda county property-owners are happy over the contemplated improvements to the harbor.

Personal.

COL. WM. T. SUTHERLAND, president of the Holmes Mining Co. of Nevada, has returned from a visit to England.

J. T. PARKS now has a fine superintendent's residence at the Kennedy mine, Amador county, and has moved into it with his family.

EVAN WILLIAMS, the well known mining and mill man of Nevada, is about to remove to this city to engage in the abattoir business.

PROFESSOR R. H. TUCKER, now at the observatory in the Argentine Republic, has been appointed astronomer at the Lick Observatory at \$1800 a year.

JUDGE NILES SEARLES of Nevada county, ex-Chief Justice of the Supreme Court, has been appointed a Commissioner of the Supreme Court vice Foote, resigned.

MARTIN JONES, capitalist and mining operator of San Francisco, who is president of the Belmont Company and a shareholder in the Albany mine, has been visiting his mines in Amador county.

JOHN B. HOBSON, the well known Placer county hydraulic miner, who for a year past has been operating a large hydraulic property in British Columbia, is spending the winter in California, and is for the present living in San Leandro, Alameda county.

W. T. ROBINSON is an old California miner who has of late been prospecting on the Kenai peninsula, Alaska, where extensive veins of coal have been found. Many of the coal veins crop out along a sandstone bluff overlooking Kachekmak bay, and can be seen a mile away, one above the other. Some of these veins contain thousands of tons of clear coal, which can be easily loaded on vessels. Reefs of the article have been washed out by the action of the water, and great quantities can be found on the beach all around the peninsula. Kachekmak bay is a landlocked harbor, making it perfectly safe for vessels at anchor. The distance from San Francisco is but nine days by steam and from 14 to 25 for sailing vessels. The cost of mining and freighting the coal to San Francisco would be less than \$3 a ton. Across the bay from the coal veins are found ledges of gold, silver and lead. Sixty miles across the peninsula at Tornagua arm, the head of Cook's inlet, a gold placer thirty miles in extent was discovered last summer, which was worked by four or five prospectors who took out from \$3 to \$5 a day with rockers. Later in the year another placer was found near Cook's inlet, opposite Kenai peninsula, from which it is reported that as high as \$150 a day to each man was taken out by means of the sluice box. This is scale gold and resembles that found in Calaveras county of this State.

JACK RIVERS, a miner in the employ of the Pyramid Co., N. M., was killed in the Henrietta mine last week. He put in some shots and climbed out of the mine, but went back before the last one went off. His body was literally filled with pieces of rock. A miner in Frank McCabe's mine, at Big Bug district, Arizona, had better luck. It seems that two men were in the bottom of the shaft and had just ignited the fuse which was to explode twelve sticks of giant powder. One man went up in the bucket and the other started to climb a rope to the ladder. When a short distance up, the latter man fell back. His light went out, as did also his partner's, and he yelled that he was lost. His partner called to him to pull the fuse, but his voice was drowned by the explosion of the twelve sticks of powder, which he felt sure sounded the death-knell of the man in the bottom of the shaft; but, strange to say, the man escaped unhurt. If he can tell how it happened he ought to for the benefit of the mining community.

Mines at Elk City, Idaho.

ELK CITY, IDAHO, Feb. 4, 1893.

TO THE EDITOR: Elk City is situated in Idaho county, Idaho, at the head of the south fork of the Clearwater river about 100 miles from Lewiston, the head of navigation on Snake river. It was discovered in 1862 and was very rich in spots, but the spots are nearly all worked out now—that is, the rich spots. Yet there are several creek bottoms that prospect fairly well. Being too deep for the old-timers, these immense bodies of gravel (in some places from five to ten miles long and from 300 feet to half a mile wide) have lain dormant for over thirty years. On one of these creeks a Chicago company has located about 500 acres of ground, and last season put in a dredge at a cost of \$42,000, the creek being too flat to work by flume. On another creek a California company, under the management of Mr. Dan Greer of San Francisco, have acquired by location and purchase about 200 acres of ground on which they are putting in a bedrock flume and two giants. On still another, or rather three more creeks, Mr. Greer has located and bonded about 1500 acres of ground on which he intends to put a bedrock flume and run a bedrock tunnel nearly a mile long. Still there is a score of other creek-bottoms in this immediate vicinity just as rich as these awaiting the advent of capital to open them up and make good paying mines of them. California capital is taking quite a hold here lately, especially in placer ground, for there is no debris law to stop the miner, and anyhow miners make the laws here.

The quartz of this camp has been as much or more neglected than the placer. I have prospected through four of the chief mining States and I have never seen such wonderful ledges of refractory gold rock as I have seen here. There are hundreds of ledges of very fine-looking sulphuret rock of from four to twenty-five feet wide, and assaying from \$12 to \$65 to the ton, and several of them can be traced for miles on the surface.

This is the most inviting field for capital for either placer or quartz that I know of. The country is out of the way of all travel, and mining men never even hear of it. It is so far from a railroad or mining center that it has been entirely overlooked, and most of those interested are old men that have lived here since the sixties and made a living by coyoting around the bars on shallow places and took no interest in quartz or big hydraulic placer mining. They made an easy living without dredges or giants. The ore of the district is generally iron sulphurets where gold predominates in value. When the ore is rich in silver, which is only in a few places, arsenical pyrites take the place of the iron sulphurets.

The country rock of the district is gneiss with dikes of syenite and porphyry, running northeast and southwest, between which some very fine contact veins are found, although the best ore is generally found in the fissure veins. The Blue Dragon is a true fissure vein four feet wide, the ore of which assays \$20 to \$65 per ton and is very uniform. The Gentle Annie, an extension of the Blue Dragon, is similar in character to the latter. Ore from this ledge sent to Denver for treatment by the cyanide process gave returns \$34 per ton and a saving of 94 per cent.

The Buster is a fissure vein and, like the other, there are five or six extensions located on it.

The Mineral Hill is also a fissure vein, and it is also exposed by tunnels and shafts a distance of 7,000 feet. These three veins are all grouped inside of two square miles.

The Lillie May is a contact vein and is six and a half feet between walls. The ore assays from \$10 to \$42 per ton. The Blanco is also a contact vein—or rather a mountain. It is from 12 to 35 feet between walls and assays from \$10 to \$28 per ton. This is the largest body of ore in the camp. There are a lot more, but I have made this sketch too long now.

M. L. MURRAY.

THE break in the Santa Cruz division of the Southern Pacific is giving Superintendent Fillmore more trouble than any other portion of the system. It seems impossible to find any means of fixing the tunnel so that the next rain will not almost knock out all previous repairs. The mountain is continually sliding, slowly but surely, and the work of months is undone in an hour. Mr. Fillmore says that the repairs would probably have to be postponed now until after the rains were over for the season. "We are about discouraged in this work," said he, "for no matter how strong our braces, or how much work we have done on that tunnel, some morning we go there and there is nothing to be seen on the track but a mass of rock and sand. No human power can withstand the awful force and might of that sliding mountain."

SENATOR BERRY has prepared a proposed amendment to the constitution, designed to relieve the legislatures of a very burdensome question which now takes up much of their time each session. The resolution reads: "The legislature, by general and uniform laws, may provide for the formation of new counties; but that no new county shall be established which shall reduce any county to a population of less than eight thousand; nor shall a new county be formed containing a less population than five thousand; nor shall any line thereof pass within five miles of the county seat of any county proposed to be divided. Every county which shall be enlarged or created from territory taken from any other county or counties, shall be liable for a just proportion of the existing debts and liabilities of the county or counties from which such territory shall be taken."

VANDEBILT is the name of a new district on the Mojave desert, in this State. The town at present consists of 200 people, 40 tents and one small frame house. Lumber costs \$90 per 1000 feet, water 3½ cents per gallon and potatoes 5 cents a pound. The railroad from Goff's station toward Vanderbilt is graded for 14 miles and there are five miles of track laid.

Where the Columbia River Gold Comes From.

The placer gold found in the northern part of the State of Washington, on the banks of the Columbia river, is very fine scale gold. The pay dirt is only six inches in thickness, except in places where it has lately been washed down from the original deposit. At same level on each side of the stream, about six feet above high water mark is seen the strata of red and brown earth and gravel that carries the dust. The gravel is about the size of a pin head to boulders that are from four to eight inches in size each way, generally flattened both sides and twice the width in length. This coarse gravel is made of several kinds of rocks, granite predominating, considerable quartz, some greenstone and slate, but few of the brimstone, dolomite. So the character of the gravel helps determine whence the gold came from. There is no gold found higher up on the benches, so we must conclude that the deposit was made at one period of time and at a comparatively late date. There are no large nuggets found, only one kind of gold and nearly of one size; the shape of this dust gives it a peculiar motion under water. None is found on bare rocks in low water, but very little in deep channels that have become dry; the most favorable place is in shallow water with but little current and at high water mark, and it is spread evenly with the gravel on benches of 300 feet or less in width—all of these things must be taken into account in order to determine where it came from and how far it traveled before resting.

In early days an ounce per man per day with sluices was the best pay reported from reliable sources, generally one-fourth that much was taken out; finally the Chinamen worked large fields of it, not making over \$1.50 per day, and even less. No doubt there are places on the Colville reservation side of the river and in that portion soon to be thrown open to the explorer, many good bars that will remunerate with sluice and rocker.

The summer of '92 I concluded to try and find the source of this deposit, thinking it might lead me to the mother lode. Going up the Pend d'Oreille river I found the same deposit of rock and gravel, the same gold with another kind that was much coarser and darker in color and more valuable. The same deposit was found on the Columbia river above the mouth of the Pend d'Oreille. So I concluded the source was not a mother lode, but a large and extensive belt of gold-bearing rock at or near the head of the several streams putting into the Columbia from the east. Going up Little Salmon river the same deposit was found at the forks of the stream, showing plainly that both forks had their supply of gold from the same field, therefore it was to the north and east. Sullivan creek, that empties into the Pend d'Oreille several miles above the Salmon has the reputation of having the same kind of gold in a lesser degree, and that stream comes from the northeast. So by the map one can locate this gold field, that I found to be from three to fifteen miles wide and of unknown length, at least thirteen miles long. Following up the south fork of the Salmon river, (I will say here that the coarse gold on the Salmon river is supplied by ledges within six miles of the mouth of that stream, as none of that kind of gold is found above that point, probably in or near the mineral belt discovered by Death-on-the-Trail Proctor last season,) most of the country rock for the first 15 miles is dolomite, not much show for a gold ledge in such rock; then comes a dyke of mica slate with large veins of quartz miles in length. Here was supposed to be the mother lode, but each one proved to be barren, yet up the stream into dolomite again I found colors to every pan of the same character as that found on the Columbia. As we approach the head of the south fork the gulches are deeper, the timber larger, the mountains higher, the Sullivan interlocks with the Salmon and Priest rivers, a sharp divide between each that runs up in ragged peaks where snow remains the year round. Here all the panning fails to raise a color. Had I passed the mother lode? To be sure there is a dyke of chloritic slate 1000 feet wide crossing from north to south full of pockets of cellular quartz, but two weeks of hard work proves that there is nothing in it. So up the highest peak 8000 feet high to see what kind of rock is there—on the east side of that mountain, called Snow mountain by prospectors, lay tilted over on its side a rock nearly a mile in thickness that was once a placer field now turned into stone. There were all kinds nearly of round water-worn pebbles and boulders imbedded in this slate rock, from the size of a pea to four foot granite and quartz, shaped like hen's eggs and sticking out where the broken places occurred. Some strata of brown color were taken and pounded up and panned out and the proof showed up with a half dozen colors of Columbia river gold.

The higher peaks of that divide, cut by tributaries of Priest river, Sullivan creek and Salmon and Kootenai rivers, hold the remnants of a once mighty placer field. Those mountain tops were once a valley, and before that a mighty flood passed through it carrying from the far north the gravel, sand, gold, clay and sediment that ages after made what is called conglomerate rock. The forming of channels, draining this large scope of country by the streams mentioned above, lowered the ledges of this plateau; what was left is now our mountains, the rock tilted over towards valleys or entirely washed away, down to the bed rock beneath the later deposit. The absence of colors on the western slope in the near vicinity of the summit, goes with the fact that there the conglomerate is all gone down the valley. Many hundreds of feet of the underlying limestone is cut out, so no colors could remain under such circumstances.

I could give pages of argument in favor of this theory, but prefer to wait of space to give you these few cold facts. It may save some other prospector months of labor and disappointment. It well repaid me for the summer's work.—H. S. BACK in Northwest Mining Review.

The Use of Asphaltum for Reservoir Linings.

Read by MR. JAS. D. SCHUYLER, C. E., of San Diego, at the December meeting of the American Society of Civil Engineers.

For a number of years past experiments have been made in rather a small way in various parts of California in the use of asphaltum for reservoir linings, particularly in the southern portion of the State, where the natural product abounds in a great variety of forms, from hard rock to liquid "mineral tar," so called, oozing from the ground in springs. The natural properties of asphalt seem to render it a useful material from which to form a water-tight coating for reservoirs. It is insoluble in water, and neither acids nor alkalis dissolve it or affect its cohesion; hence it imparts no taste or color to water coming in contact with it. It is elastic and will yield to a considerable settlement of the surface on which it lies without cracking or losing its integrity. It is easily repaired, and new material may be made in unite perfectly with the old, wherever a path may be needed.

The writer has had occasion to examine a number of small reservoirs so lined, and in almost every case found them in satisfactory condition and generally impervious to water. One of these that had been in use for four years at the town of San Buena Ventura, was an extreme example of the serviceability of asphalt. A circular reservoir of about 100 feet in diameter and ten feet deep had been excavated in light, sandy and gravelly soil for perhaps one-third of its depth, the material excavated being used in the embankments. It was paved on the bottom and sides (sloping 1 to 1) with cobblestones laid in mud, the spaces between being partially filled with the mud mortar. When dry, this rude masonry was covered with a thin coat of liquid asphalt, poured on hot and spread with brooms. The thickness of the sheet did not exceed one-eighth, and in places was not over one-sixteenth of an inch thick. The reservoir was not covered. After being filled with water, one portion of the banks was said to have settled outward more than two feet without breaking the integrity of the lining. The cost of the lining was very small; it has required few repairs, and bids fair to render service indefinitely. Another reservoir examined by the writer was excavated in firm shale and soft sandstone, with nearly vertical sides, on which the hot asphalt was successfully applied. This was a small house-service supply reservoir, and had been a year in use without repairs when examined.

Other instances of the use of asphalt to repair cracked and broken concrete linings of reservoirs were noted, in all cases with success. The writer subsequently constructed on his own premises a circular reservoir 64 feet in diameter, 7 feet deep, which he lined with asphalt $\frac{1}{2}$ inch thick. The side slopes were 1 to 1, and the first coat consisting of a mixture of 15 per cent of La Patera asphalt (which contained by analysis, 66 per cent of pure bitumen) and 85 per cent of beach sand, after being heated to a temperature of 300° was spread with hot rakes and consolidated by means of hot tampers and smoothing irons. It was laid in sections 2 feet wide, half the height of the slopes. The edges should have been painted with pure liquid asphalt before the adjoining section was laid next to it, and it was, doubtless, owing to a neglect of this precaution that, after being in use one year, small cracks appeared, outlining the joints where the various sections were laid. These cracks were all repaired, however, with half a barrel of asphalt and the labor of one man for three days, and the reservoir is in perfect condition after two years, although exposed to the sun. The sheet of asphalt was tacked to the slope by means of strips of strap iron 6 inches x $\frac{1}{4}$ inch x $\frac{1}{2}$ inch, driven in at intervals of 18 inches in each direction. A second coat, consisting of La Patera asphalt fluxed with about 10 per cent of "mineral tar," the heaviest of the natural oils of California, heated to a temperature of about 250° F., was applied over the entire surface. It was poured on as thinly as possible and ironed down with hot smoothing irons. Its thickness averaged about $\frac{1}{4}$ of an inch.

With this experience, and after a careful examination of the principal asphalt beds of southern California, as well as the sea walls laid in asphalt and described by W. C. Ambrose, M. Am. Soc. C. E., in Vol. XXIV. of the *Transactions of the Society*, the writer felt justified in recommending the use of California asphalt for the lining of two large distributing reservoirs constructed at the city of Denver, Col., by the Citizens' Water Company. These reservoirs, known as the East and West Ashland Avenue Reservoirs, lie side by side, and were excavated to their full depth of 32 feet on the upper or higher side, the material being used to form artificial embankments on the lower side, where the minimum depth of excavation below the natural surface was 6 feet. They are intended to be filled to a depth of 26 feet, and there was, therefore, on one side 20 feet in depth of water to be supported against a made bank. The whole of the West and a portion of the East Reservoir were excavated during the winter of 1890-91, when there was a good deal of frost in the ground, and although a 12-ton steam-roller was employed to consolidate the banks, a considerable settlement was anticipated, which would have been fatal to a concrete lining.

The dimensions of the West Reservoir were as follows: bottom, 341 x 256 feet; top, 350 x 420 feet; maximum depth, 32 feet; depth to roof line, 29 feet; depth to high-water line, 26 feet; side slopes, 1.33 to 1; capacity, 22,000,000 gallons. East Reservoir: bottom, 152 x 494 feet; top, 235 x 580 feet; depth, slopes and capacity the same as the West Reservoir.

The material excavated consisted of 2 or 3 feet of sandy loam, 12 to 15 feet of hard clay impregnated with alkali, and 8 to 12 feet of shale, the "bed rock," so called of the country. On the completion of the embankment the slopes were sprinkled and rolled with a slope-roller weighing 5 tons, drawn up the slopes and lowered by an engine placed on a track along the top of the banks.

At the time the West Reservoir was completed and ready for lining, it was found impossible to get the amount of California asphalt needed within the time available, and it was decided to use Trinidad asphalt, which could be ob-

tained on the ground from the Barber Asphalt Company, then engaged in paving the streets, and having in operation a capacious plant for melting and mixing the materials. A contract was made for the delivery of the materials at the reservoir at a given rate per day. It had to be hauled in wagons about 2 $\frac{1}{2}$ miles, and as the roads were muddy and the weather cold, some of the asphalt chilled on the way and had to be rejected. All that was put on was supposed to be of a temperature of 250° and over. Beginning at the bottom, the slopes were laid in horizontal strips about 10 feet wide, the thickness averaging about 1 $\frac{1}{4}$ inches. It was spread with hot rakes, tamped as hard as possible with square tampers, kept hot and frequently changed, and ironed with heavy, hot smoothing irons. While the sheet was still warm, anchor spikes, cut from strap iron 1 x $\frac{1}{2}$ inch, 7 to 8 inches long, were driven through the asphalt into the bank, in rows one foot apart, about 12 inches from centers in the rows. Every other row was driven down flush with the surface, the alternate rows being allowed to project 1 $\frac{1}{2}$ inches above the surface temporarily to serve as a rest for strips of 2 x 4 inch lumber, placed loosely above them on the slope, thus forming steps for the workmen to ascend while working on the space above. When the finishing coat came to be applied, these projecting spikes were driven flush and all painted over. The bottom thickness was about one inch. After spreading and tamping, it was rolled with a cold steam roller weighing five tons. The finishing coat of refined Trinidad asphalt, fluxed with residuum oil, was poured on hot, from buckets shaped like a coal hod, and ironed over with hot smoothing irons, heated to a cherry red. These irons had to be passed over the surface quickly, and when first applied produced a yellow smoke; but it was found that perfect cohesion with the first coat could not be secured except by thorough ironing with very hot smoothers. When finished, the surface had a bright, glossy appearance as though varnished. The cost of this work was as follows:

FIRST COAT.

1304 tons, 20 per cent asphalt mastic, 80 per cent sand at \$12.....	\$15,648 00
15 tons, 15 per cent asphalt mastic, 85 per cent sand at \$10.....	580 00
86.21 tons liquid asphalt, fluxed with oil, at \$40.....	3,448 40
Fuel for heating irons and for steam roller.....	276 02
Lights.....	36 00
Tools.....	179 75
Peg irons—material, cutting and dipping in asphalt.....	650 00
Labor.....	1,921 50
Use of roller six days.....	60 00
Total.....	\$22,799 67
Area of surface covered, 154,580 square feet. Cost per square foot, 14 94-100 cents.	

The East Ashland Avenue Reservoir was lined with California asphalt in July and August of the current year. The material was furnished from the Santa Barbara county beds of the California Petroleum and Asphalt Company, the asphalt being from the La Patera mine and the flux from Las Conchas mine, near Carpinteria; was prepared on the ground by the Blake Asphalt Company of Denver.

The La Patera asphalt mine is one of the most interesting deposits of rock asphalt on the Pacific coast. It was discovered four years ago by an outcrop a few feet from the shore of a small estero, within 100 yards of the surface of the ocean. The principal part of the deposit seems to be below the level of the ocean, the lowest workings being now 70 feet below tide level. The asphalt is mined out in masses of from 1 to 20 cubic feet, by means of long wedges. A peculiarity of the mining is the fact that all picks and wedges become sharper with use and soon take on a keen edge. The asphalt is brittle, is easily mined, and is not sticky, nor does it run together in a solid mass on being piled in the sun. It is remarkably uniform in quality, and carries 55 to 68 per cent of bitumen, of which but 9.24 per cent is volatile at 1100° F. It is sold at the mine for \$20 per ton. The fluxing material known as Las Conchas asphalt is obtained from an extensive deposit along the seashore near Carpinteria, some 30 miles east of the La Patera mine. It is richer in oils and will volatilize 4 per cent at 300°, and 86.25 per cent at 1100° F. It carries 12.58 per cent of nonvolatile or "fixed" bitumen, besides the 86.25 per cent of volatile at 1100°, or a total of 98.83 per cent of bituminous matter and 1.17 per cent of mineral. The process of extracting it from the sand in which it is found is by passing it through a long cylinder of peculiar construction, called a "cochleon," which is made to revolve in vat of boiling water. The sand passes out of the end of the cylinder clean and white, while the asphalt floats to the surface of the water, and is then specially treated with hot compressed air to drive off the moisture. It is shipped in barrels, and is a viscous mass of somewhat less fluidity than "cold molasses" in ordinary summer temperature.

In preparing the mastic for coating the reservoir, the proportion of the La Patera asphalt and Las Conchas flux used was about 78 per cent of the former to 22 per cent of the latter. It was boiled in open kettles for about 12 hours, at a temperature of 250° to 300°, and frequently stirred to prevent burning or sticking to the bottom. The sediment that settled to the bottom of the kettle was removed with long-handled shovels, and used later on in another portion of the work for an asphalt concrete. For the first coat, 20 per cent by weight of this mastic was mixed with 80 per cent of sand (previously heated to the same temperature), in a cylinder provided with strong paddles. The mixing occupied about two minutes, when the charge was dumped into a cart standing underneath the mixer, whence it was conveyed to the bottom of the reservoir and there dumped upon wooden platforms, and thence taken in hot scoops to the spot where it was applied. The spreading and raking were similar to that described in the other reservoir, but the compression of the asphalt was accomplished by means of bot rollers, instead of cold rollers, tamping-irons and smoothers, a method which accomplished the work in a superior manner to the former process. These rollers are formed from sections of cast-iron pipe, turned off smooth upon the outer surface, and

fitted with a hanging fire-basket inside the cylinder, in which a fire was maintained. For the bottom work a 30-inch pipe was used, and for the slopes the pipe was but ten inches on account of the weight. This was pulled up the slopes by means of a $\frac{3}{4}$ -inch wire cable, passing over a pulley at the upper end. Six to seven men were required to manipulate this roller, besides a man to guide the roller with a long handle. The result of hot rolling was to consolidate the sheet of asphalt into a compact mass, driving out the air and producing more perfect cohesion of the particles than is possible by tamping, ironing or cold-rolling, for the reason that the asphalt is worked while it is still hot, and the roller passes over it so quickly and presses it so thoroughly that it has no opportunity to chill or cool off before it is compressed, and the hot roller keeps up its temperature until the work of consolidation is complete. Hot rolling is as essential to perfect work in asphalt as thorough tamping is to successful results in cement concrete.

The weight of the mixture of asphalt and sand, after being compressed, was found to be 127 pounds per cubic foot. The total surface area covered below the roof-line was 143,667 square feet, requiring 2,302,837 pounds of the mixture, or about 16 pounds per square foot. This gave an average thickness of the sheet of 1.53 inches. The sheet of asphalt was pinned to the slopes in a similar manner to that employed in the other reservoir, the pins being driven one foot apart in alternating rows, except when the shale was too hard to admit of the strap-irons being driven into it. This occurred over about one-fifth of the area, and there heavy sixpenny steel wire spikes were driven somewhat closer together.

The second or paint coat of pure asphalt was applied after the first coat was completely finished, and was thoroughly ironed with redhot smoothers, to secure as perfect adhesion with the first coat as possible. This result was attained perfectly, except in spots where dirt had become ground into the surface of the first coat by the tramping of muddy boots after rain. The most satisfactory way to insure a perfect contact and cohesion of the two coats is undoubtedly to apply the second coat immediately after the first is laid and while the latter is still warm and clean, but there were many little reasons and objections raised by the "expert foreman" to this method of doing the work, which might have been overcome and should be overcome in the execution of any similar work to insure the most perfect results. The thickness of the second coat was from one-eighth to one-quarter inch. It has a leathery consistency, toughness and elasticity, and although it manifests a tendency in warm weather to creep and gather in wrinkles down the slopes in both reservoirs, it never breaks, and remains impervious to water. The total amount of asphalt used on the second coat of the east reservoir was 178,470 pounds, or 1.24 pounds per square foot.

The cost of materials was as follows:

First coat.....	8.98 cents per square foot
Second coat.....	2.48 " " "
Total.....	11.46 " " "
Labor, fuel, spikes, etc., cost for both coats.....	1.99 " " "
Total cost for labor and materials.....	13.45 " " "

When the interior lining of the east reservoir was finished, the slopes above the roof line of both reservoirs were covered with a heavy coating of asphalt, $\frac{2}{4}$ to 3 inches thick. This was carried entirely over the top of the embankment between the two reservoirs, and for a width of five feet over the top of the banks surrounding them, forming a substantial pavement or pathway entirely around each, at a cost of \$4218.59 for materials and about \$700 for labor.

The total expenditure on both reservoirs on account of asphalt work was \$48,498.69, or about \$100 per 1,000,000 gallons of storage capacity. A reasonable estimate of the cost of lining these reservoirs in an equally substantial manner with cement, concrete, brick or stone exceeds this figure 100 per cent, although this was not the chief motive for adopting asphalt in preference to other materials.

At the time the west reservoir was lined the embankments were fresh and had been hastily constructed; the reservoir was imperatively needed for immediate service, and a material for lining was required that would stand the vicissitudes of the emergency without serious impairment. The result proved the wisdom of the choice, as settlement did occur, although not as great as anticipated. A fissure was opened in the lining, about ten feet below the roof line, on the highest part of the made bank, the crack being some six inches wide and 100 feet in length, but it was repaired without drawing the water off, at an expense of \$20. During the past winter a severe test was applied to the lining to prove its tenacity and hold upon the bank. Ice formed to the thickness of 18 inches when the water stood within eight feet of the top, and, while it was frozen fast to the lining all around, the water was lowered and raised again three to four feet, without the slightest injury to the asphalt. There was not the same urgent reason for lining the east reservoir with a flexible material, as the embankments had a year's settlement and were reasonably solid; but with a year's experience in the west reservoir, and a feeling of confidence in being able to improve upon the method of lining, as well as upon the materials and mixtures, there seemed no good reason to change for a more costly lining.

A few of the special difficulties encountered in the work may be of interest in the way of suggestion. A small quantity of seepage water, following the seams in the shale near the bottom of each reservoir, had to be taken care of, and caused no little annoyance. It was insignificant in quantity—not exceeding one gallon per minute in all—and was disposed of by cutting deep drains in the bottom and up the slopes as high as the moisture appeared, filling them about one foot deep with broken stone, covering them with plank, and then ramming in earth to the top. These drains converged to collecting wells, into which short sections of 12-inch cast iron pipe, with the hell ends turned upward, were inserted; and these were kept baled out during the progress of the work. The asphalt was brought up

to these pipes and well cemented to them. When the lining was completed, these pipes were capped with light cast iron plates, fitting into the hells, in the center of which was placed a two-inch flap valve made of sole leather, with an iron disc on top to hold it in place against a pressure of a few ounces. These are sufficient to admit the water freely into the reservoir when it is empty, without exerting any appreciable lift upon the asphalt sheet, while they will close to prevent leakage when the pressure in the reservoir exceeds that of the subsoil waters. There are about 15 of these valves in the two reservoirs. They seem to serve in a satisfactory manner the purpose for which they were designed.

The crumbling of the surface of the slopes, when dry, especially after a little rain, caused no little inconvenience, as the dirt rolling down would become mixed with the hot asphalt, as it was being applied to the slopes. To remedy this a portion of the slopes of the east reservoir was plastered with a thin coat of cement, lime and sand mortar, about one-half inch thick. This, when dry, made a smooth, clean surface on which to lay the asphalt. The writer is inclined to the opinion that wherever asphalt is used on earth slopes of reservoirs, this preliminary plaster coat should in all cases be applied; and it should be laid with care, nearly one inch thick, the cost of which should not exceed five cents per square yard. On this should then be spread a thin coat of liquid asphalt, similar to the finishing coat, as the foundation for the paving mixture with sand, which latter may advantageously be reduced in quality to about 16 per cent of mastic to 84 per cent of sand. This method of lining would render the paving coat impervious to subsoil water as well as to the water of the reservoir, and thus preserve it from the slight tendency to softening under the action of water, wherever compression is not perfectly accomplished and the sheet is at all porous. The finishing coat of liquid asphalt really constitutes the lining. The paving, or body coat of asphalt and sand, which is a body for the finishing coat to cling to, is only impervious to water where compression is absolutely perfect.

With the utmost care there will always occur spots where compression is imperfect, due to a variety of causes, most potent of which is inequality of cooking, the occasional burning of a batch, the application of it at too low a temperature, the slight yielding of the foundation, the use of tools insufficiently hot, etc., etc. For this reason the writer recommends that the body coat be laid between two coats of the liquid or pure asphalt. By "pure" is meant a mastic containing at least 75 to 80 per cent of bitumen. Under these conditions, and with the exercise of watchful care over every stage of the work, the writer believes that a reservoir lining may be made with asphalt that will be of indefinite serviceability.

The Russell Process.

From a little pamphlet issued by the Russell Process Co., of Park City, Utah, we take the following summary concerning the improved method of lixiviation for free and rebellious silver and silver-gold ores and tailings, either raw or after roasting:

The Russell process, both metallurgically and economically, occupies the place formerly held by: first, the Kiss, Patera, or old leaching process; second, amalgamation of silver and silver-gold ores; third, smelting of "dry" ores and ores averaging not over 15 per cent lead, or such as do not contain sufficient lime or iron to make them desirable as fluxes in smelting.

The Russell process has been in continuous use at the following mills for the periods given below: Vedras, Sinaloa, Mexico—Anglo-Mexican Mining Company, 40-stamp mill, five years; Park City, Utah—Marsac mill, Daly Mining Company, 30-stamp mill, four years; Aspen, Colorado—Holden S. & M. Co., 30-stamp "custom" mill, one year. The practical operation of the process can be easily inspected at any one of these places.

The cost of chemicals for the Russell process has averaged, on over 200,000 tons treated at various mills, less than \$1 per ton of ore, and about 65 cents per ton on 50,000 tons of tailings recently handled by the process.

The following table gives the average analysis of the ores treated by the Russell process at the Vedras, Park City and Aspen mills, illustrating the applicability of the process to ores of widely different composition:

ANALYSIS OF ORES.

NAME OF ORE.	Silica, Per Cent.	Carbonate of Lime, Per Cent.	Iron, Per Cent.	Zinc, Per Cent.	Lead, Per Cent.	Sulphur, Per Cent.	Barium Sulphate, Per Cent.	Copper, Per Cent.	Arsenic, Per Cent.	Magnesia, Per Cent.
Vedras.....	25.0	46.5	9.8	.....	.....	.....	.....	.....	.....	.....
Park City.....	78.6	2.0	1.6	5.3	3.6	0.7	.....	.....	.....	.....
Aspen.....	20.9	20.0	9.1	1.5	1.0	7.5	24.8	.....	.....	5.8

It has also been demonstrated in the case of various ores which have been treated by this process, in amounts varying from 1000 to 40,000 tons, that the zinc and sulphur contents of ores may reach as high as 20 per cent each, lead 15 per cent, pyrites 40 per cent, barium sulphate 45 per cent, and carbonate of lime 45 per cent, without materially increasing the cost of treatment or decreasing the per cent of gold and silver extracted by the Russell process.

By an entirely wet method of parting and refining, recently invented, the product of the Russell process is now treated at each mill, and the gold and silver recovered separately as fine metals, subject to no further parting or refining charges. This method is simple, and the cost very low.

As compared with smelting, in the case of the ore treated at the Marsac mill, the net profits are in favor of the Russell process by about \$250,000 per year.

A comparison of the Russell process with the Kiss, Patera

or old leaching process, as determined by four comparative mill runs, of one to three months duration each, made at Vedras during the last five years, shows that the Russell process extracted 16.5 per cent more of the value of the ore at \$6 to \$7 more net profit per ton, averaging, at the rate of 13,000 tons, \$86,000 net profits per year, over the other processes.

As to the comparison of the Russell process with amalgamation, as illustrated at the Marsac and Ontario mills, in Park City, Utah, the following statement gives a summary of the results on the ore treated in each mill during 1891:

To treat the same number of tons, 25,000 per year, of approximately the same composition as at the Marsac, the Ontario (amalgamation) requires 45 per cent more power, 39 per cent more labor, 30 per cent more stamps, 100 per cent more furnaces, 48 per cent more salt, and 40 per cent greater cost of chemicals, and yet yields a less per cent both of gold and silver than the Marsac mill using the Russell process. These differences foot up a total saving of \$91,000 per year in favor of the Russell process.

The treatment, at the rate of 50 tons per day, of old tailings at Vedras, by the Russell process, has yielded for three years a net profit of \$21,000 per year.

The exact figures on the extraction of gold by actual "clean up" in the above two mills show that for 1891 the Russell process extracted 25 per cent, and for 1892, 24.3 per cent more of the total gold in the ore than was extracted by amalgamation.

Specifications for Roads.

The Supervisors of Marin county have advertised for bids under the new road law for keeping the roads in order. The bids are asked for by districts, and the number of miles in each district is given. Following are the specifications:

All roads to be kept in a safe and passable condition at all times; to be kept well rounded up in the center with the best material to be had, so that water will not remain on any of the traveled portion thereof; to be properly ditched and drained, and all culverts must be kept open for the free passage of water, and in good repair; repair all bridges and culverts, and renew or rebuild any bridge or culvert under sixteen feet span; keep the traveled portion of the roads cleared of all brush or branches that would interfere with the comfort and safety of ordinary travel; keep all the roadways clear of thistles and cockleburrs.

THE general sentiment in favor of better roads has led Congress to take action in recognition of it. There are two bills looking to the awakening of the people generally on this important subject. One appropriates \$10,000 to enable the Secretary of Agriculture to make inquiries in regard to different systems of road management throughout the country and to make investigations in regard to the best methods of road-making. Also to prepare a publication on the subject suitable for distribution, and to enable the Secretary to assist agricultural colleges and agricultural stations in disseminating information.

STATE SENATOR MCGOWAN thinks legislation in fences is needed. He has introduced a Senate bill defining lawful fences as follows: If made of stone, 3½ feet high, 3 feet at base and 1 foot at top. If a worm fence, to be well laid and 5 feet high. If of posts and boards, posts not more than 8 feet apart, and if intended to turn all stock, five boards, 6 inches wide; if nest cattle, horses and mules, three boards, the top at least 4½ feet high. If made of pickets, posts and rails, ditch or ditches, wire, hedge brush, or other material, the fence must be equally strong and secure as that of posts and boards.

JIM MASON, Thomas Breen and a Finn whose name could not be learned, who were employed in the Rapid River Mining Company's camp in Idaho county, started for Lewiston, Idaho, with pack-horses to purchase provisions, which had run short. The trail to Lewiston runs through a very mountainous country, which is as yet entirely unsettled. After the men had left a severe snow-storm set in, which later developed into a blizzard, and the cold became intense. Searching parties failed to find the miners, who doubtless perished from the cold.

CALIFORNIA ZOOLOGICAL CLUB.—At the annual meeting of the California Zoological Club, the following officers were elected for the ensuing year: Dr. J. G. Cooper, president; Dr. Gustav Eisen, vice-president; Miss Effie A. McIlriach, secretary; T. S. Brandegee, treasurer; E. C. Van Dyke, curator. Councilors—Miss Emily I. Wade, Will W. Price, Miss Lillie J. Martin, Charles Fuchs. Dr. J. G. Cooper delivered an interesting lecture on "The Shells of the Gulf of California," showing hundreds of specimens.

GEOGRAPHICAL SOCIETY OF THE PACIFIC.—Officers elected at the Council Meeting of January 31, 1893, to serve one year, are as follows: President, George Davidson, Ph.D., Sc.D.; 1st Vice-Pres., Th. E. Slevin, L.L.D.; 2d Vice-Pres., Hon. Ralph C. Harrison; 3d Vice-Pres., Irving M. Scott, Esq.; Treasurer, H. Durbrow; Home Corresponding Secretary, Hon. Jeremiah Lynch; Foreign Corresponding Secretary, P. W. Poulson, M.D.; Recording Secretary, John Partridge; Assistant Recording Secretary, T. F. Trenor, M.A.

JOHN MCFARLANE was instantly killed in the Ontario mine, Park City, Utah, on Sunday. He was working in a slope fifteen feet below the six-hundred level, when, without warning, the ground gave way and he sank with it to the seven-hundred level, timbers, earth and all going down in a confused mass. The vein is very wide at that point and the walls are smooth, which probably rendered the timbers unable to hold the weight.

Our Animal Industries.

We are glad to see that the annual report of the State Board of Agriculture, presented at the annual meeting held last week in Sacramento, places full emphasis upon the importance of the animal industries of the State and the field which invites their extension. Other matters are, of course, duly considered in the report, but these other matters, notably the fruit products, are constantly before the public eye and do not lack appreciation. The State Board of Agriculture has a plain duty to perform in securing for the animal interests such recognition as their importance and their possibilities merit. If the State Board could go even farther in this direction than it has hitherto, give the road and field qualities of the horse greater prominence in its efforts and add thereto the publication of useful reports upon the most successful lines of livestock-breeding and care, veterinary practice, etc., under the conditions which prevail in this State, the State society would have a more general support and a better reputation throughout the farming regions of the State. It plainly recognizes the importance of such things and will, we hope, accept our suggestion that it go farther in their pursuit.

The report to which we allude makes an interesting generalization on the standing of California in the blood-horse world, which we quote as follows:

The great battles for supremacy waged under the auspices of this society right here at home encouraged our breeders to go forth and meet the world with their products, and the result is that one of our great sires has, during the season just closed, achieved a world-wide reputation by having eight of his get obtain records of 2:15, or better, and only second in the list of money-winning sires of America. Another mighty sire obtained the world's stallion record, so that California has at this writing the fastest individual stallion of the world; the sire of the greatest number of extreme speed performers in the world; the sire (recently dead) that produced the greatest number of horses with trotting records of 2:30 or better; the largest thoroughbred stock farm in the world, and last, but not least, the highest-priced thoroughbred stallion in the world.

When we state as a fact that this State annually sells the greatest number of thoroughbreds in the New York market that comes from any one breeding farm, amounting in the aggregate to \$120,000, and that the sales of trotting stock aggregate \$500,000 yearly in the same market, and that California sales here at home of improved-bred stock reaches \$300,000 per annum, making an aggregate of nearly \$1,000,000, can it longer be doubted that the interest in question is of some importance to California?

This is certainly a most gratifying showing in that line of effort. Even those who believe other lines of work are more important will grant that. But the State Board is also cognizant of other lines which need promotion. The report earnestly favors more systematic and comprehensive work in the live stock interest on the part of the general Government. It approves the tendency toward the building up of great slaughtering enterprises here and the systematic extension of the local production of cured meats and the utilization of all the by-products of the abattoir. The local field for such work is notable. Our importation of hams, bacon, lard and canned meats each year from the factories of the Western and Middle States is of such magnitude as to cause one not informed to doubt the figures. There was an average of six carloads of ten tons each per day for every day in the year 1892 brought from across the Rocky mountains. To make up a home product to cut off this importation we have our vast area of alfalfa lands and our grain fields, which sadly need a better outlet than now exists for wheat.

In the dairy line, too, there is room for considerable extension if marketing is so ordered that the genuine shall not be depressed by the spurious. No country has the forage facilities for producing milk equal to ours, but we cannot increase our dairy facilities and import from 600 to 1000 tons of condensed milk into the State each year. The quantity of this great commodity used within the State, to say nothing of that needed for the territory of the Northwest and countries that lie adjacent to be furnished by ship cargo, makes it a plan most feasible at this time. There is no reason why, with our cheap forage facilities, we should not control this business for the entire country west of the Rocky mountains.

The San Francisco market alone consumes the milk of from 10,000 to 15,000 cows in their use of butter and fresh milk for daily delivery. Still we import from 2000 to 3000 tons of packed butter each season. We are thus situated, and abide the coming of others to profit by the indifference of our own people in the formation of a stock company for the development of this dormant resource.

We are glad the State Board has thus prominently called attention to these matters. It is clear that all who seek investment in California production need not follow fruit lines. It would be far better if they should turn their effort and capital into other channels. Conditions favor such investment. There is abundant suitable land available at low prices. Pure-bred cattle of all kinds were never cheaper, and one can begin with the best blood for a fraction of the cost which would have been required a few years ago. We long to see more of this State in alfalfa. We would enjoy more breeding farms and dairy buildings. We are not afraid of the outcome of the fruit investments at all, but it will make these investments all the more secure and would stimulate activity and prosperity in all other industrial lines if the animal, as a basis of intelligent and progressive production, should receive wider attention at the hands of our people.—*Pacific Rural Press.*

A BILL of considerable importance has been introduced in the legislature by Raw, of El Dorado county, adding a section to the exercise of the right of eminent domain. It adds canals, ditches, flumes, aqueducts and pipes for supplying water for operating machinery for the purpose of generating electricity for the supplying of mines, quarries, railroads, tramways, mills and factories with electrical power, and also for supplying electricity to light mines, quarries, mills, factories and incorporated cities.

Mechanical Progress.

New Textile Mills.

The report upon the textile industries in 1892, which has just been published by the *Textile World*, exhibits a condition of industrial prosperity which must be highly gratifying to anyone interested in the welfare of the United States. According to this report, the accuracy of which cannot be questioned, there were established during the year 272 new mills, employing 31,500 persons. Of these mills 73 are devoted to the manufacture of cotton, 49 to woollen, 93 to knitting, 21 to silk, six to plush, three to linen, three to lace curtains, two to jute, four to chenille goods, six to shoddy, seven to cotton-bating and five to dyework and bleaching.

Of the 73 new cotton mills 19 were built in Massachusetts alone. These 19 mills contain 474,000 spindles, 8835 looms, and give employment to 5775 persons. The size and importance of these mills are best seen by comparing them with the mills built at the south during the same time. In the States of Alabama, Georgia, North Carolina, South Carolina, Texas and West Virginia, there were erected in 1892 a total of 39 mills, or exactly 20 more than in Massachusetts, or one more than twice as many, yet the 19 Bay State factories operate 474,000 spindles and 8835 looms, while the 39 Southern mills operate only 251,800 spindles and 5851 looms. The employees in the new Southern mills exceed those in the new Massachusetts mills by just 20.

In the woollen industry there have been established 49 new mills, of which 22 are in New England. Of the latter, eight are in Massachusetts and seven in Maine. The increase in the producing capacity of Maine was especially noticeable, as nearly one-third of the entire increase in the United States was furnished by this State.

A total of 93 knitting mills were built, 20 of which were in New York and 32 in Pennsylvania. The new silk mills started numbered 20, which, together with the greatly increased importation of raw silk and the great decrease in the importation of the manufactured article, shows the new start this industry has taken in America. In no other year has the United States shown so great progress in the textile industries.

Determining a Steamer's Speed.

The reports so far made public with regard to the performance of the U. S. practice cruiser Bancroft are exceedingly favorable to that vessel and creditable to her builders, the Samuel L. Moore & Sons Co. of Elizabethport, N. J. It will be remembered that we have quite fully illustrated this vessel and her machinery, and it is gratifying to know that upon trial she has proven her ability to so far exceed the contract requirement of 12 knots per hour as to make it probable that her builders will receive as a premium about \$45,000 above the contract price. The method of determining her speed is a new one, which has been introduced by Chief Engineer Commodore Melville, and consists essentially in first standardizing the screw, this being done by running the vessel over an accurately measured mile course, and making careful comparisons between the observed speed of the vessel and the number of revolutions made by the engines. By a series of such observations, the ratio between the rotative speed of screw and the rate of the vessel is definitely determined, and then, during the four-hour run at sea, the speed of the screw, or the number of revolutions made by it, are taken as indicating the speed of the vessel. This transfers the actual measurement of the speed of the vessel from the conditions where it is almost impossible to determine this accurately to conditions where it is quite possible to determine it with the greatest precision, and it is reasonably certain that a given speed of screw will produce a given speed of the vessel, this having been pretty conclusively shown by the experience of the engineers of transatlantic steamships, who declare that under ordinary conditions they can tell, with considerable accuracy, how near they may be to port, by looking at the revolution counter at any time, and that the total number of revolutions during a transatlantic trip varies surprisingly little.—American Machinist.

TEMPERING.—A new process of tempering a 14-inch Harveyized armor-plate was tested at Bethlehem on January 16th. Heretofore this was done by ejecting ice-water against the red-hot plate, in a vertical position, with the result that the water was made boiling the instant it touched the upper end of the plate, and the heated water running down did not have the proper effect

on the rest of the plate. In the new process the plate was laid down in a specially-prepared frame; the water was made ice-cold by treating it with salt, and was then led to a large sprinkler lowered within one foot of the plate. The water was forced through the sprinkler under great pressure, while the under-side of the sprinkler was kept cool by water running over it from a fixed spigot. The sprinkling continued for 1½ hours, and the plate was then taken up by a crane and immersed in the oil baths there, to remain 30 hours. The Government officers present regarded the new process as highly successful.—Engineering News.

Horse Power.

So much ignorance exists as to the meaning of the words which head this article that we have thought that a few practical words on the subject may prove of some service to our nontechnical readers, of whom we are pleased to know we possess an exceedingly large number—especially abroad. We may commence, then, by pointing out that if the boiler is new, or has never been tested, the heating surface is the best guide to a knowledge of what it will be capable of doing. If the boiler is well designed and properly set, two pounds of water should be evaporated for each square foot of heating surface, so that, on a recognized basis, 15 square feet of heating surface should be allowed per horsepower, and in estimating the horsepower of a boiler the external surface of that portion of the shell which is exposed to the fire should be estimated, and to this, expressed in square feet, should be added the area of the tubes, and of such portions of the heads as are exposed to the direct heat. The sum should then be divided by 15, and the result is the nominal horsepower of the boiler. This rule is not absolute, but, like all other rules, it has exceptions. With the most approved settings, and with well-managed fires, the evaporation is greater than that estimated above, and we find that in such cases 12 square feet of heating surface will evaporate the quantity of water required for a horsepower. In some exceptional cases the requisite heating surface is even less than 12 square feet, but we do not use less than 12 unless we have satisfied ourselves, by careful experiment upon similar boilers, similarly set, that we may do so fairly. On the other hand, if the boiler or the setting is poorly designed, or the draught more imperfect, or the fires badly handled, more than 15 square feet may be required. There is no such thing possible as an absolute rule for the horsepower of a boiler, and the rule we have above merely represents what, in our experience, a given boiler, well designed, may be expected to do under ordinary circumstances.—Machinery.

Effects of Pickling Iron.

The effect of pickling and rusting on the strength of iron has been shown by A. Lelebur, of Berlin. Rails, joists and bars were subjected to various conditions: (1) in the condition as delivered; (2) after exposure for purposes of rusting; (3) zincd (galvanized) and tested at once; (4) galvanized and exposed for a time; (5) pickled in acid and immediately tested; (6) pickled and kept for a time in a dry place. The pickling was done with sulphuric acid diluted with water in the proportion of 1:100. The samples were tested for transverse, tensile and compressive strains, and under a falling weight, these experiments being made on the same sample for each of the six conditions. The bending tests with wrought iron joists showed substantially the same for all the conditions; the maximum loads carried showed differences, being highest in the natural condition and lowest when freely pickled. Rusting also produces a diminution of strength more apparent in the galvanized than those not galvanized. In the instances where the specimens were broken, the diminution is said to be very decided in the pickled and perceptible in the rusted specimens. The figures are: breaking strain under condition 1, 35 tons; under condition 2, 33.9 tons; under condition 4, 32.7 tons; under condition 5, 29.6 tons; under condition 6, 30 tons. The steel specimens showed results which follow the same law.

ENGINEER J. H. JONES, of the North Pacific Coast Railway steamers, when having the boilers of the steamer San Rafael overhauled last year, had a kind of pocket built on the inside of the main shells at one side, into which the feed water is pumped, and from which the sea blow-off leads out. This pocket consists of a sheet about three feet wide flanged at the sides, and riveted to the main shell inside, leaving an annular space around the side of the boiler, 30 x 2½

inches, the top or overflow being a little higher than the flues. The area of this chamber being about forty times that of the feed pipe, the water injected rises slowly, is thoroughly heated, and precipitates nearly all of any mineral substance it may contain before reaching the main body of water in the boiler. Several times each day the blow-off valve is opened for ten seconds or so to keep this intake chamber clear. A hand-hole is provided for inspection, and the cost of the whole was about \$35 on each boiler of 300 horsepower. The idea is neat, effectual and inexpensive.—Industry.

Scientific Progress.

Saltiness of the Sea.

Professor Edward Hill read a paper before the Victoria Institute recently on "How the Waters of the Ocean Became Salt." From an inquiry into the character and affinities of the organic forms of the past geological ages, the conclusion was justified that the waters of the ocean must have been salt from very early geological times, but it by no means followed that they were as fully saline as those of the present day. There were two ways by which they might account for the salinity of the ocean waters from very early periods of geological time. First, by supposing that the primeval waters were saturated with acid gases which were held in suspension in the vapor surrounding the incandescent globe; or, secondly, that the salinity resulted from a process resembling that by which salt lakes of the present day had been formed. He thought that they must concur with Dr. Sterry Hunt that from some cause or other chlorine largely abounded in the waters of the primeval ocean, as by far the greater proportion of the salts were chlorides and chlorine was very slightly represented in river waters of the present day.

From the example of closed lakes they could determine the process of salinification with the utmost certainty. Throughout greater or shorter periods these lakes have been receiving the waters of rivers bringing down both mechanically suspended sediments and chemically dissolved salts, silicates and carbonates. The sediments were precipitated over the bottoms of the lakes, and the water, being carried off into the atmosphere in the form of vapor as far as it entered, left behind the dissolved ingredients. These necessarily augmented in quantity, and ultimately the waters of the lakes became saturated with salts and carbonates, which were then deposited. The ocean was a closed lake of enormous magnitude, and they were thus brought to the conclusion that the saltiness of the sea might have originated in very much the same way as had that of the Dead Sea, Lake Urmiah, or the Great Salt Lake of Utah, and many others which possessed in common the characteristic of having no outlet. When the great envelope of vapor which surrounded the incandescent globe began to condense upon its cooling surface, the resulting waters, though containing, as Dr. Sterry Hunt supposed, acid gases, were destitute of saline ingredients. The process of salinification began with the first streams which entered the seas from the bordering uplands, and this process carried on throughout the long ages preceding the silurian period, brought the waters to a condition suited to sustain the life of forms of inhabitants representative of those which inhabit the ocean at the present day. These long ages might be supposed to include not only the archæan and æzoic periods, but that in which the first crust was in course of formation over the incandescent globe.

Heat Storage.

Professor W. C. Unwin, in the course of a lecture, delivered at the Society of Arts last Friday evening, drew attention to a means of storing energy, which, if it fulfills all that is claimed for it, may prove of great service in electric-light central stations. In this system the energy is stored in the form of superheated water kept under pressure, in boilers specially covered with nonconducting materials in order to minimize the loss or heat from radiation. When the energy is required the pressure is taken off the superheated water, and it at once turns into steam; when energy is being stored, the pressure is again increased.

Judging from the results already attained with this system, it is possible to store large quantities of energy in a comparatively small space, in a convenient manner, and at a cost far below that of storage batteries of equal capacity. If experience shows this to be really the case, it will result in great economies being effected in the maintenance of

alternate-current central stations. They will then be able to compete on favorable terms as regards storage, and the cost of production per unit, with continuous-current ones, and one of their chief sources of loss will be eliminated. We await with much interest further information on this most interesting and important subject.—Electricity.

XYLOLITH.—A new material manufactured in Germany and called "xyloolith" ought to be valuable for use in lagging steam-boilers and steam-cylinders, if all the properties claimed for it can be substantiated. The name is from two Greek words respectively meaning wood and stone; from which it may reasonably be inferred that it partakes of the nature of both the materials from which the name has been suggested. It is made of sawdust by treatment with some ingredient or ingredients, the process being a secret with the manufacturers. Its leading properties, which seem to peculiarly fit it for insulating purposes, are stated to be noninflammability, nonconducting power, imperviousness, freedom from shrinkage, and susceptibility to a high polish. These properties, added to the fact that it is cheap enough to compete with wood in architectural uses, are just the requirements for steam lagging, and there appears to exist no mechanical difficulty in applying it to this use, since it can be worked like wood, according to descriptions of it that come from apparently reliable sources. Whether it is really superior to sawdust compositions of American manufacture that have been put on the market only a competitive trial can determine; but its qualities, as described, appear to be quite different, it being harder and stronger, and capable of being polished.—Engineering Magazine.

WATER IN PLANTS.—A problem familiar to all students of botany is that relating to the ascent of water in plants. Text books explain the phenomenon in more or less plausible ways, and doubtless it may be news to many to be told that they knew nothing about it. The latest, and perhaps the most thorough investigation in this direction, is that by Prof. Strasburger, of the University of Bonn. The evidence all appears to favor the conclusion that the ascent of water in plants is a purely physical process. That it is not a vital one was proved by the ability to cause an upward flow in plants previously killed by various methods. The conditions necessary for the ascent of liquid are stated to be that the cell walls should be in a state of imbibition, while the tracheæ are within certain limits filled with water and isolated from the air. The learned professor definitely disposes of some time-worn explanations when he states that atmospheric pressure simply helps to keep the water suspended, that the only importance of transpiration in this connection is that it makes room for the ascending fluid, and that root pressure is not immediately concerned in the process at all. Capillarity has long been known to be insufficient to account for the phenomena, and the net result of the research is that we are left in the position of knowing nothing whatever concerning the cause of sap in plants, save that the process is a purely physical one.—Scientific American.

VEGETABLE GROWTH IN WATER MAINS.

—A vegetable growth in the water mains at St. Paul, Minn., has lately, according to the *Engineering Record*, been the cause of some trouble. The first case was discovered by the superintendent, in one of two service pipes in a single trench supplying a double house. A complaint was made of bad water, which flushing failed to improve. One of the pipes delivered pure water and one supplied a muddy liquid that was of no use. This fact led to the conclusion that one of the services was foul; and the remedy applied on this supposition proved effective. The boiler of a portable engine was connected with the faucet of the kitchen sink from which the muddy water came, and a steam pressure of 70 pounds forced against the 35 pounds water pressure for 30 minutes—thereby driving the water out of the pipe. Since that time the pipe has always delivered clear water, and twelve similar cases have been successfully treated in the same manner. Great care has to be taken that there are no leaks in the service pipes, and that none of the fittings are open during the steaming process.

HOW TO FREEZE WATER ON A SMALL SCALE.—Take a concave watch glass, touch the convex side upon water so as to leave a drop hanging on the glass. Pour a little ether into the concave and blow upon it. The rapid evaporation of the ether will render the glass so cold that the drop of water will be frozen.

Electricity.

Storage Batteries in Electric-Light Stations.

The annual report of R. R. Bowker, first vice-president of the Edison Electric Illuminating Company of New York, is a very complete one, and full of interesting matter. In regard to the experiments now in progress by the company with a view to determining the commercial value of storage-battery installations as auxiliaries to regular dynamo plants, Mr. Bowker says:

"The general use of storage batteries in connection with station work in England, France and Germany, as seen during my investigations abroad, made it seem advisable to experiment with a storage battery of a type in successful operation in England, which would not be complicated with the legal questions involved in the batteries hitherto known in this country. Arrangements were therefore made with the Crompton-Howell Storage Battery Company, Limited, of London, to install in a portion of our new 53d-street station, arranged for that purpose, a storage battery of 2000 ampere-hours capacity, on which guarantees of 85 per cent. efficiency in ampere output and other guarantees were obtained. This battery is now installed at that station and will presently be working as a part of our operating system, and its results during the experimental period of six months will throw much light on a problem of very large importance to this company as well as to other Edison low-tension direct-current systems throughout the country. After this battery has been in operation for a sufficient period to demonstrate its advantages and disadvantages on this company's system, it is intended that the general operating superintendent shall give attention while abroad to the actual workings and economies of the storage batteries of the various types in use in England and on the continent. It is still an open question whether a storage-battery plant, which cost in round numbers about twice as much as a generating plant of an hourly capacity equaling the total-charge capacity of the battery, can be economically utilized on a system so large as that of this company, requiring continuous operation in at least two of its stations throughout the twenty-four hours. On the other hand, the storage battery, with the addition of a 'booster' or motor dynamo for automatically raising voltage, developed by Mr. Barstow, of the Brooklyn Edison Company, should be of considerable use to this company in developing remote districts not yet ready for station equipment, if not for increasing the economy and efficiency of the dynamo plant, and will most certainly be found of use in connection with smaller Edison plants whose minimum load is so small as to permit of the use of a storage battery to replace one labor shift."

Electric Motors on Steamships.

Although electricity now plays an important role on great steamships, there is, beyond a doubt, a chance to extend its use profitably. This general statement, which is perhaps somewhat trite, is suggested by the recent disablement of the Umbria on her voyage from Liverpool to New York. Every one has read how the shaft was repaired under the direction of the able chief engineer, who determined to undertake the work although his assistants considered the job absolutely hopeless. Under the most adverse circumstances, the shaft was repaired, and the ship was able to steam into New York harbor at half speed. It was a triumph of trained skill, wonderful patience and perhaps good luck. The fracture of the shaft was located at such a point that only five men could be employed at a time upon the repairs. Before the undertaking was completed and the shaft was allowed to revolve, it was necessary to drill in the aggregate 180 inches in the hardened steel. As the work was necessarily done by hand, it was a slow and tedious task. The appliances on board that could be utilized were few in number and very simple in character, according to the statement of the chief engineer. It is not expected that a well-equipped machine-shop can be maintained on shipboard, and machine tools cannot be readily employed in the confined spaces where their use might prove desirable; but it seems to us that at least one addition could profitably be added to the meager stock of appliances now carried. An electric motor could readily be moved from point to point for supplying power where it might be needed. Its dimensions are so small that it could be located wherever a man could find room to work.

All the large ships are now lighted by

electricity, so that power is always available. In the case of repairs on the Umbria shaft, a portable drill could easily have done the work of a dozen men, and have done it better. While delay apparently was not dangerous with the Umbria, still the utmost desire to complete the work was experienced even by the cool and level-headed chief engineer, who admitted that the engines were started before the fractured shaft was repaired as thoroughly as he wished. Every gain of an hour would have been worth more than the cost of a score of electric motors. While danger perhaps did not exist in this particular case, it is easy to conceive of a situation where rapidity in the completion of repairs might be essential to the safety of a vessel. The value of an electric motor for furnishing power under such circumstances cannot be overestimated. The cost of a portable electric drill or of a suitable design of portable motor for furnishing power for the numerous mechanical operations now necessitating manual labor would be nominal, while its use in an emergency could be supervised by one or two men, leaving the other engineers free to attend to other necessary work. Such an equipment, in view of the Umbria incident, should form a part of the store of tools on all the great steamers in which electric current is available.—Western Electrician.

Electrolytic Methods of Disinfection.

Mention has been made of the fact that at the time of the outbreak of cholera at Havre and Rouen the prefect of the Seine utilized electrolytic methods of disinfection to combat the epidemic, says *Electricite*. The system employed was that of Eugene Hermite, which involves the electrolysis of common salt or any other of the chlorides, producing a discoloring and disinfecting solution. The boiler and engine are located on the ground floor, while the dynamo and electrolytic bath are placed in the room above. Sea water, or a water in which sea salt has been dissolved in the proportion of 2½ kilogrammes to the cubic meter, is introduced into the electrolytic vat. Under these conditions there are formed hypochlorites, or at any rate combinations of oxygen and chlorine possessing the power of destroying malodorous products and infectious germs. This disinfecting and antiseptic solution is drawn into a reservoir, whence it is piped to the street. It is used for washing, etc.

At the present time, when matters of sanitation demand special attention, and when the problem of rendering sewerage innocuous demands solution, the electrical means of disinfection become of paramount importance. Sewage from the Paris mains is partly employed in irrigation in the plains of Gennevilliers and Asnières, on the left bank of the Seine. The system was connected in 1872, and several hundred acres are now under treatment. During part of the year irrigation is not possible, and even if it were there are still collected in these fields almost all the disease germs of the city of Paris. The land becomes then a place for germ culture, and is a constant menace of an epidemic of infectious disease. It seems to be both necessary as well as prudent to sterilize the sewage.

The several electric processes of purification will be recalled. Among others are that of William Webster, tried in England, and that of Hermite, which has for some years been employed at Rouen, with results which, if not decisive, are at least very encouraging. These processes are familiar. The sewage water, with some chloride added (common salt or chloride of iron, for example) is caused to pass through the electrolytic process. This direct means of treatment is perhaps impracticable in a city like Paris, inasmuch as the amount of sewage water reaching the collecting reservoir at Asnières ranges from 300,000 to 600,000 cubic meters daily; but an indirect method is perfectly feasible, which would consist in adding to the sewage a concentrated solution of electrolytic hypochlorite.

The problem of electrolytic disinfection becomes simple and practicable wherever sea water is procurable. On board vessels, where motive-power is available, it will be a simple matter to prepare the solution; and seaports, which are nearly always infected, can be readily supplied with this simple chlorine disinfectant. Let the sanitary commissions of ports, which so often are the starting-points of epidemics, utilize these processes, and we will no longer see cholera at Toulon or at Havre, or at Hamburg. No antiseptic can be prepared more economically than electrolyzed sea water.

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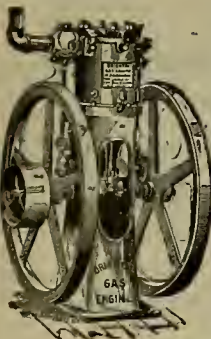
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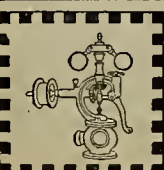
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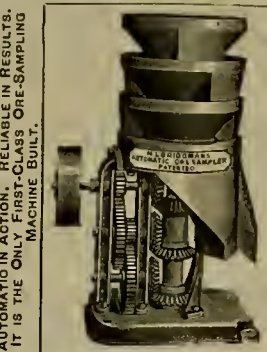
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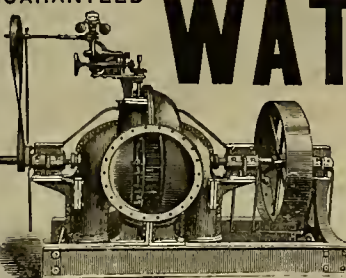
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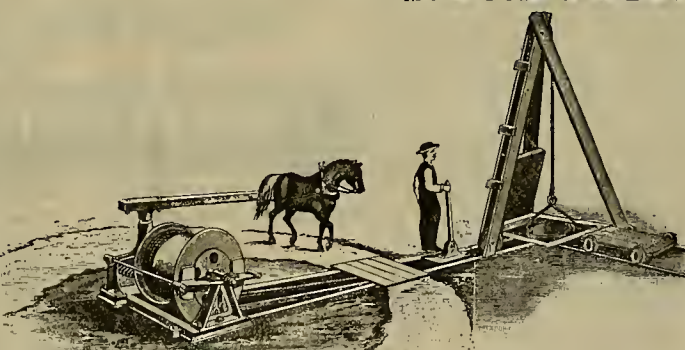
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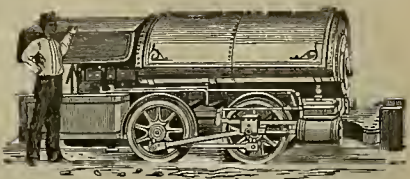
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Miners' Consumption.

The necessity for a scientific and thorough inspection of mining methods, so far as ventilation is concerned, is forced upon attention by the alarming prevalence of miners' consumption. It is a disease of modern origin, and is believed to be due to inhaling poisonous gases, arising from the use and combustion of high explosives, in which nitroglycerin is the powerful constituent. Nitroglycerin was discovered in 1846, and has come into use in mining only within the past 25 years. Before then only black powder was used. So far as we can learn from a study of mining records or medical accounts, the disease known as miners' consumption was unknown until very lately. It is for this reason that it is supposed to be due to the gases arising from the use of nitroglycerin. To determine the truth of the claim would require a widely extended and well-directed investigation by physicians whose practice is in mining regions. Work of this kind would certainly be cheerfully done by physicians, if there were some department of the State or Government which would intelligently inaugurate it.

If it were once determined that it is due to these gases, then the problem of better mine ventilation, and the way to secure it, so that the disease may no longer murder its hundreds of victims, will be a new one for the State and mine managers to consider.

The disease is one which is closely allied to ordinary consumption, and appears to be impossible of cure. So far as we know, and so far as we can learn from inquiry, it never attacks any but veteran miners, who are naturally those who have been most and longest exposed to the influences supposed to produce it. Many a one we all know, from Gilpin, Clear Creek and Boulder counties, has gone down to death with it. It is, too, most deadly on the Comstock. Dan DeQuille writes us that "almost every week from one to three are borne to the grave on the Comstock with this disease, and at the same time reports of the death of others are constantly being received from other regions of the Pacific coast to which they have strayed after being inoculated with the seeds of the deadly disease.

"All who develop the disease die sooner or later, even though they leave off mining in any region and take up their residence in the most favored sections of the valleys of California. The fell disease goes with these veteran miners to Mexico and Peru, to south Africa, Australia and China, and lays many of them in foreign graves. Some manage to get back to their families alive, but it is only to bid them an eternal farewell, close their eyes and die.

"All these men who are dead and dying entered the mines young, strong and the very picture of robust health. Had they gone to work at farming, lumbering in the mountains or stock-growing on the plains, instead of going into the smoky depths of the mines, most if not all of them would now still be hale and strong. It is sad to see these men, mere wasted skeletons, stretched upon their beds and dying amid a whole household of young children, just at an age when they should be at the prime of life and strength. Death stalks through the dark chambers of the mines in a thousand shapes. Generally his blows are sudden and terrible. More pitiable, however, seems the living death of the doomed man lingering down to the tomb in the never-relaxed clutch of miners' consumption."

If the State has any duty to perform in the way of doing anything for miners, would it not be well to put that work into shape, and at least give us an investigation of this subject, together with others relating to the great industry which is so closely related to the health, life and material prosperity of each and every citizen? Will our legislature do anything for miners?—Mining Industry.

Output of Creede in 1892.

Creede is in reality only one year old, that is to say the actual development of the mines began in January, 1892, and with it the great boom which has only been equaled by Leadville in the rapidity of its progress. What has been accomplished in that short period, let the *Candle* tell in its very succinct and forcible style. The number of carloads of ore shipped was 3512, representing 46,155 tons at an estimate value of \$4,215,800. Since the extension of the Denver & Rio Grande railroad from Wagon Wheel Gap to Creede, completed in February, 1892, the total tonnage shipped over that line to December 31, ultimo was 45,030 tons. The average value of the Amethyst and Last Chance ores is placed at \$90 a ton. It is estimated not less than \$750,000 has been expended in prospecting for ore. Until last fall the bulk of the output was from two

mines, although twelve are represented in the final count. The Amethyst and Last Chance continue to be the largest producers. But the New York Chance by the recent discovery of large ore bodies is likely to equal the most prolific of its rivals in the quantity and value of mineral extracted.—Mining and Scientific Review.

Some Noted Australian Nuggets.

Referring to an interesting article entitled "Gold in Nature," and mentioning a nugget of 134 pounds in weight found in "South Australia" (Victoria?), perhaps a reference to some noted Australian nuggets might be of interest. Chief among these nuggets comes the "Welcome Stranger," which contained over 2300 ounces of gold, worth about £9,200, and was found on February 5, 1869, at Moliagal, near Dunolly, in Victoria. Next in rank comes the "Welcome" nugget, found on Bakery Hill, Ballarat, in the same colony, on June 11, 1878, at a depth of about 180 feet. This nugget weighed 2200 ounces in the gross, and its value was £8780. It was sold for £10,000 to a party who wanted it for show purposes, and doubtless cleared thereby the difference in cost.

It would perhaps be a little too much to say that "nuggets have family ties," but though they usually "lie low," there are at times exceptions to the rule, and when found near the surface, as in the following instances, they are not infrequently in groups. The selections referred to (found in 1870, 1871 and 1872) are taken from the record of the "Berlin" gold-field in Victoria, and do not include the many minor nuggets found in that locality.

"Precious" nugget, 1717 ounces value £6,868, Catto's Paddock, at a depth of 12 feet.

"Viscount Canterbury" nugget, 1121 ounces, value £4420, John's Paddock, at a depth of 15 feet.

"Viscountess Canterbury" nugget, 896 ounces, value £3656.

"Kum Torr" nugget, 795 ounces, value £2872, Catto's Paddock, at a depth of 12 feet.

"Needful" nugget, 249 ounces value £984 Catto's Paddock, at a depth of 12 feet.

"Crescent" nugget, 179 ounces, value £704, John's Paddock, at a depth of 2 feet.

As a rule, the richest gold-fields are not those where the largest nuggets are found, as witness the well-known Gulgong gold-field. The largest piece of gold found on this field was only 64 ounces in weight, and was so thoroughly coated with ferric oxide that the man who was forking the gravel, etc., out of the sluice-box in which it was found, was going to throw it out, but that its weight attracted his attention.

WHAT THE PRESIDENTS DIED OF.—Rutherford B. Hayes was the only man that ever held the position of President to die of heart disease. Washington expired of pneumonia, John Adams of natural decline, Thomas Jefferson of chronic diarrhea, James Madison and James Monroe of natural decline, John Quincy Adams of paralysis, Andrew Jackson of consumption, Martin Van Buren of asthmatic catarrh, William H. Harrison of pleurisy, John Tyler of a bilious attack, James K. Polk of chronic diarrhea, Zachary Taylor of bilious fever, Millard Fillmore of natural decline, Franklin Pierce of inflammation of stomach, James Buchanan of rheumatic gnut, Abraham Lincoln assassinated, Andrew Johnson paralysis, U. S. Grant cancer, James A. Garfield assassinated, Chester A. Arthur Bright's disease. He was one of three Methodists to become President, Johnson and Grant being the other two.—Columbus Journal.

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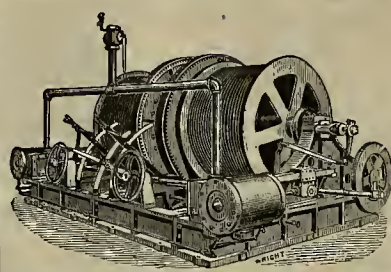
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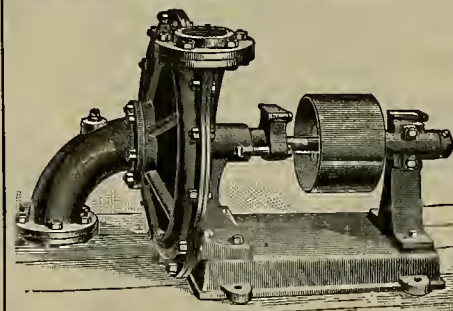
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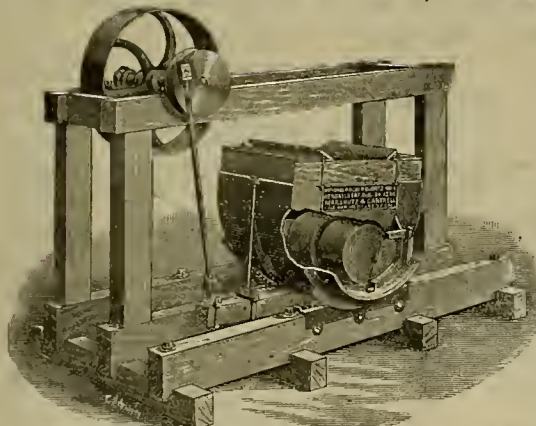
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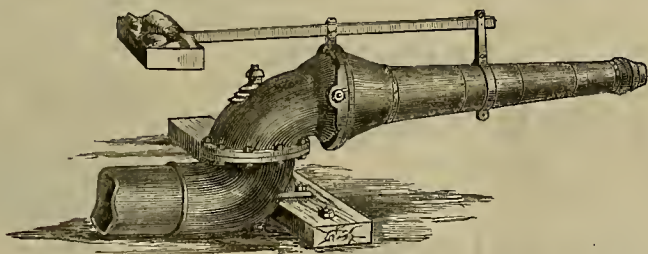
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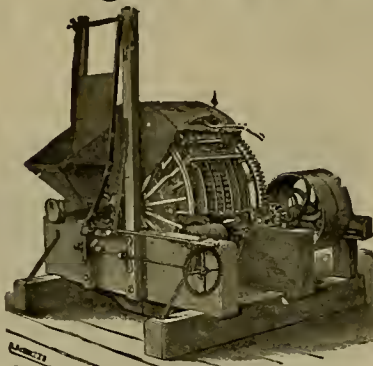
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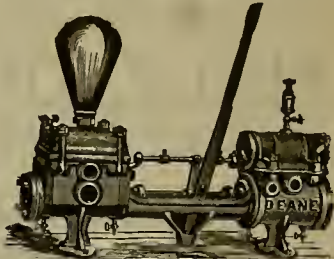
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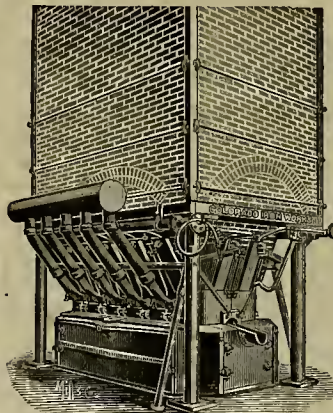
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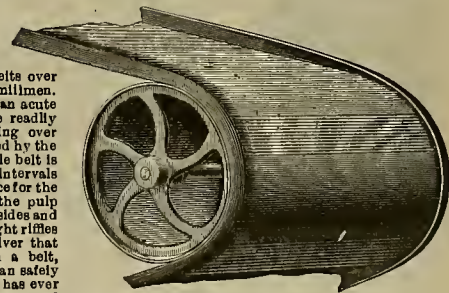
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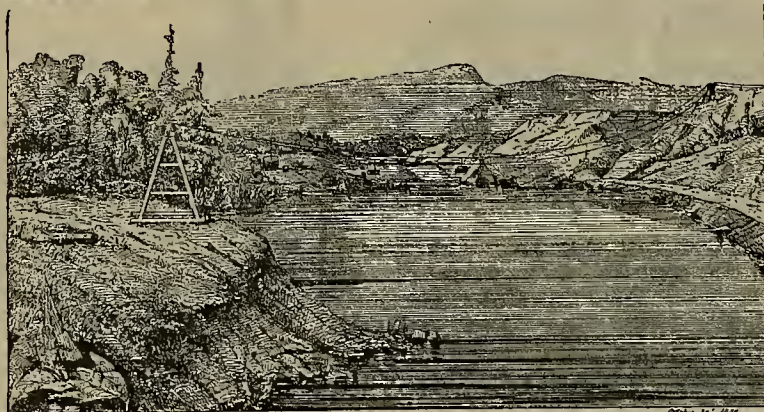
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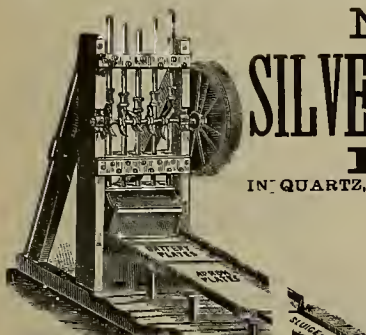
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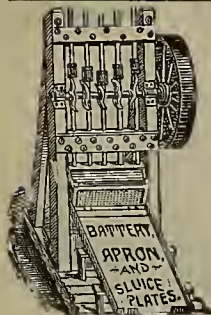
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MASON.—*Amador Ledger*, Feb. 10: Most of the people interested in the prospect on Joe Mason's ranch are from Woodbridge, in San Joaquin county. They are so well pleased with the prospect, and with the possibilities in the claim, that upon the 4th inst. those originally interested in the project met and organized a corporation, to be known as the Mason Mining & Milling Company. Jas. Perrott was elected president, Jno. Perrott secretary and treasurer, and Chas. Newton manager and superintendent. The capital stock is \$150,000, divided into 1500 shares at \$100 a share. Every share has been taken. The company's works are in Amador county, and their place of business in Woodbridge. We are told that some of the ore recently assayed went \$10 to the ton in free-milling ore and \$110.50 in sulphurets. At the mines there are 150 tons of ore on the dump, and it is estimated there are 10,000 tons in sight. The vein is 9 feet wide and 50 feet deep. A stamp-mill and other machinery will soon be erected at the mine. The directors are James Perrott, Dave Ray, Sam Woods, Robert Boyce and Wm. Huron. The owners of the Good Hope mine are arranging to put 12,500 shares of stock on the market to secure working capital. They will proceed with work at the mine as soon as the details can be arranged. The Kennedy still seems to be on the improve. Current rumor has it that that great gold-producer made a cleanup of \$72,000 last month. Dr. Boydsau, owner of the New London mine, in the Plymouth district, has purchased the old Pioneer, adjoining, and gone to work on the tunnel, with the intention of making a thorough prospect of the property.

QUARTZ MOUNTAIN.—*Amador Ledger*, Feb. 10: In the Gold Mountain mine some important changes are taking place. Mr. Palmer has been relieved of his position. The mine has closed down, and, of course, operations have ceased at the mill. Mr. Kyle has gone down to interview the owners of the mine. Until he returns nothing definite regarding the future of the property will be known. J. Dynan is still operating his hydraulic mine. The conflagration that occurred at the Gold Mountain mine resulted in the total loss of the blacksmith shop and all combustible tools, such as hammer-handles, pick-handles, etc. The bellows were also stopped, which nearly stopped operations at the mine until another could be procured. Palmer succeeded in putting up a fireproof edifice in a few hours, notwithstanding the inclemency of the weather. The mill has suspended operations for a few days until a tramway can be extended into the bowels of the mountain and a "raise" sunk, which will lessen expenses and facilitate the handling of the ore. I understand that Wm. Ford and a crew of young Americans have taken the contract to sink the Gover shaft 100 feet, and have already commenced operations.

Butte.

AT BANGOR.—*Marysville Democrat*, Feb. 13: Frank Lane returned from Bangor last evening, to which place he had gone on business in connection with the Turner Mining Company, in which he and a number of Marysvilleans are stockholders. Thus far the company have not put up any engines or machinery, but are raising the dirt by windlass and placing it on the bank. As soon as the weather clears up they will put in a large engine and works. The dirt is very rich from this mine and the shares are in big demand. The stock has cost the investors up to the present time about \$4.20 per share, and is to-day selling for \$15 per share. This mine promises to be second to none at Bangor. The Catskill, located near the Turner mine, made its weekly cleanup on last Saturday. They realized for the six days' work \$2000, it being the largest cleanup the mine has ever made. This mine is running one arrastre and old time miners say that it is one of the largest week's work ever done by an arrastre in the State. All the mines in the vicinity of Bangor are paying well, and this spring a big boom for that locality is anticipated.

Calaveras.

THE WILLOW MINE.—*Calaveras Chronicle*, Feb. 11: Active operations are to be resumed on the Willow mine, owned by S. C. Peck & Son of this place, in a few days. There is a large amount of gravel on the dumps, and it is proposed to wash the same before commencing work in the mine. We expect to be able to chronicle a big cleanup, as the gravel prospects at the rate of 50 cents to the pan.

MACHINERY.—A couple of loads of machinery passed through town Monday en route to the Moser mine, about a mile and a half from this place. The machinery was for the mill which is in course of erection at the mine, and which, we are informed, will be ready to start in about ten days. Developments on the ledge are progressing steadily, and everything at present points to a permanent and paying property.

Inyo.

FISH SPRINGS.—*Inyo Register*, Feb. 9: The miners of Fish Springs are now doing real prospecting work. John Escallon is running a tunnel along the Goldbug vein, which will compel the "bug" to render up rich treasures, should the aforesaid "bug" have them hidden at a depth from the surface. Geo. Gilliam is throwing his youthful energy into the development of one of the most promising claims in the district. Fuller & Malone are in high hopes of a Columbian Exposition stake from a mine which

they are developing. Antone Cuhaa and Upton Tracy have struck a fine body of ore in their mine, the Queen, just south of the Goldbug. Judications proclaim that this district will soon be famed abroad. Ex-Sheriff Gregg and Dick Whittaker only await the next crop of daisies to commence washing out the yellow dross at the O'Hern placer claim, southwest of the hamlet.

PINE ORE.—*Inyo Index*, Feb. 8: Some of the finest ore ever seen in any country is now being taken out of the Hirsh mine in the Inyo range. The C. & C. R. R. will soon put in a siding at the Eclipse crossing to accommodate ore shipments from this Hirsh.

Mono.

THE BODIE CON.—*Bodie Miner*, Feb. 10: During the past week east crosscut, 550-foot level, was extended six feet. Upraise, 500-foot level, was extended eight feet. Upraise from east crosscut, 300-foot level, was extended seven feet. North drift from above crosscut was extended nine feet. West crosscut, 200-foot level, Leut shaft, was extended 12 feet. There are employed 7 miners, 1 carman, and jointly with Mono 1 engineer, 1 blacksmith, 1 watchman, 1 foreman, 1 hollermaker.

THE MONO.—During the past week east crosscut No. 1, 1550-foot level, was extended 12 feet. West crosscut No. 2 from above drift was extended 14 feet.

Nevada.

TELEGRAPH MINE.—*Grass Valley Telegraph*, Feb. 10: This afternoon Morris O'Connell visited the Telegraph mine and brought some ore to town. The rock was from a depth of about 200 feet, and the ledge is about eight inches in thickness. The rock showed well in free gold, and a double handful of dirt from around the ledge prospected to the extent of \$2 in gold.

OSBORN HILL MINE.—*Grass Valley Union*, Feb. 14: The new local company which has bonded the Osborn Hill mine has about perfected its arrangements for the commencement of work, and operations will be started next week. The Osborn Hill mine has a history. It was located in 1851, and the lode is traceable perhaps farther than any vein in the district. Bean's Directory, published in 1867, said that it had turned out as much money in proportion to the explorations as any mine in the district—paying almost fabulously for years at a time when the quartz interests of the district were considered on the wane. The mine was tolerably well opened in 1852, from which period up to 1857 it annually brought its owners large returns. But after this date the putting up of costly machinery, and poor management, put the company in debt, and in 1864 it was sold to the late Joseph Woodworth, who added to the improvements by putting up a costly mill. The mine was extensively worked as late as 1867, and numerous drifts run, but the incline was not down much deeper than 400 feet, giving a vertical depth of 200 feet. The average width of the vein was about two feet. The ground finally proved hard and expensive to work and slow progress was made, and finally operations were discontinued, although the quartz was of good milling quality. This was at a time when power drills had not come into use, and high explosives were unknown. The improvements that have been made have since greatly reduced the cost of mining, and the new company will start with every assurance that the mine will again become a valuable one and a dividend-payer.

Shasta.

NOTES.—*Shasta Courier*, Feb. 11: Stewart and McTimmons have been constructing a house and making other improvements at their mine near Salt Creek in Lower Springs district. They have a shaft down about 45 feet, and the ledge which was about two feet wide at the top has widened out to three feet. The rock shows free gold and assays well. Work in the mine is considerably retarded by water in the shaft. Simoni is pegging away at his tunnel on Middle creek. We understand that he calculates to run in 800 feet from near the bed of the creek. They are in about 200 feet, but the rock is exceedingly hard and sometimes they only progress at the rate of six inches a day. The Gladstone, near French Gulch, is employing in the neighborhood of 70 men, but the mill is running on low-grade ore. The Minnesota mine on Spring creek, north of Shasta, is going to turn out a fortune for the owners, providing they can come to an agreement that will result in active work and development on the property. The tunnel being run on the ledge shows it to be six to seven feet wide, and the quartz is fairly sprinkled with gold. James Sutherland and William Emerson are running a tunnel on the old Sutherland mine on north fork of Middle creek, about half a mile from Shasta. If they strike the ledge as rich as it formerly was, they will make arrangements to run a longer tunnel from the bed of the creek to tap it at greater depth. Sunderland has a steam-power arrastre at the mine. The mining population of South Fork are all busy developing their mines or getting out ore for working and shipment. Bailout's reduction plant will soon be completed, and, with two milling plants in the camp, South Fork will be apt to step to the front as the bullion-producing district of Shasta county. Paige and Drury started up their arrastre on Middle creek the other day. They have a ledge of good rock from ten inches to about three feet wide, and a large seam of decomposed quartz and other that will average about \$10 or \$12 per ton, with enough in sight to keep the arrastre going for a long time. Workmen are still running the 100-foot tunnel on the Hidden Treasure ledge. When the tunnel has been extended that length, the management will determine whether to go on or abandon the mine.

Siskiyou.

HYDRAULIC MINERS.—*Yreka Journal*, Feb. 11: The mild weather since last Tuesday, and the

additional installments of rain and snow, have enabled the hydraulic miners to commence operations again with good success, although the cold nights occasionally are detrimental by freezing up the supply. However, the prospects for an excellent season in hydraulic and placer mining during the coming warm spring and summer months never looked better, as there is a vast amount of snow on all the mountains to serve as fountains of supply until later in the season than for many years past. The Ashland Tidings says Caven, the Siskiyou miner, who sold to the Spencer Mining Co. the property they are working near Cole's, has made another good strike within a few miles of the Spencer mine. He has a fine-looking ledge and wants \$20,000 for it. He sold the other for \$1200.

SALMON RIVER.—*Cor. Yreka Journal*, Feb. 13: Prospects of a prosperous season ahead are everywhere apparent. Mr. Frank Hickey and R. Boyd have a promising ledge on Eddy's gulch, just above the Fagnades mine. Harvey Bowerman also has a good-looking surface ledge, but merely a prospect, as he only found it a week ago. The workers in the old Knott Nothing mine have only a short distance to run to strike the ledge, which will prove beyond a doubt that the Knott Nothing country is more than surface diggings. The Ball mine is idle at present, on account of scarcity of water to run the mill. Dos & Daggett, on the old Evening Star, are running the mill on splendid rock. Golden & Evelth have struck their ledge with a lower tunnel, and found a four-foot ledge of probably \$40 rock, which makes a good mine and extends the quartz belt. John and Claus Peters are driving a tunnel on their prospect, and expect to strike the ledge before spring.

Sierra.

THE ALASKA MINE.—*Mt. Messenger*, Feb. 11: The persons who recently purchased the Alaska property have a quartz-mill rigged up and ready to run. They are all at work running a tunnel, with the view, it is said, of getting out some rock from the upper workings of the old mine. It is expected that a tunnel will soon be started for the purpose of tapping the ledge at a point far below the lowest point reached heretofore.

Sonoma.

THE GREAT EASTERN.—*Santa Rosa Democrat*, Feb. 11: The Great Eastern quicksilver mine, near Guerneville, was opened a number of years ago and has since been regularly worked, giving steady employment to 100 men the year round. The output has been over \$1,000,000. It is now thought the mine is worked out. The plant cost \$75,000 and the company is trying to dispose of it to the Mount Jackson mine, to which it is convenient, and it is to be hoped that they will sell it, and so keep up the work in that vicinity. It would be a paying investment for the Mount Jackson, as they have a good mine but no reduction works.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, Feb. 11: 1500 level.—We continue running water through the old stopes at different points, and continue the extraction of ore and fillings in working upward from the sill floor in the old stopes. 1600 level.—Are repairing the main south drift and the east crosscut leading therefrom to the nraise connection with the 1500 level north drift. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the nraise No. 6 carried up from the main north drift; also from the old stopes in working north from the crosscut run west from the northwest drift. Are making preparations to sink a winze from the west crosscut from the northwest drift. Have extracted during the week from the 1500 level stopes and 1650 northwest drift openings and raised to the surface 490 cars of ore about 490 tons. Shipped to Morgan mill 589 150-2000 tons of ore. Average assay value, per railroad car samples, \$26.38. The average assay value, per battery samples, of all ore worked at the mill during the week (415 tons) was \$22.70 per ton.

OPHE.—1465 level.—Have continued the work of cutting out a chamber in the north lateral drift on the sill floor of this level, at the point where connection was made with this drift by the nraise which was carried up from a point 99 feet below on the north side of the crosscut run east from the drift run south from the Mexican into the Opbir ground. In this chamber, when completed, an engine will be placed to run the cses which will pass up and down the nraise.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 18 feet; total length, 533 feet, in a soft vein porphyry formation, showing some clay.

UTAH.—340 level.—The south drift from the main west drift at a point 595 feet from the shaft has been extended 18 feet; total length, 82 feet; continuing in vein porphyry, clay and fine lines of quartz. The water flowing from west crosscut No. 3 shows a very little decrease.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 25 feet; total length, 671 feet; face is in porphyry with stringers of quartz.

UNION CON.—900 level.—The joint Union Con. and Sierra Nevada west drift, 900 level, has been advanced during the past week 23 feet, making the total distance west of shaft 2911 feet; face is in clay, quartz and porphyry.

BEST & BELCHER.—200 level.—During the past week the west crosscut, No. 1, started in north-west drift, 170 feet from our south line, has

been advanced 19 feet passing through porphyry and stringers of quartz; total length, 37 feet. 900 level.—West crosscut No. 3, started from top of upraise No. 1, from 1009 level, has been advanced 14 feet; total length, 133 feet; face in clay and porphyry. Also did considerable re-pairing during the week.

ANDES.—On 420 level north drift from east crosscut No. 1, north, was advanced 17 feet; total, 98 feet; face all in quartz.

GOLN & CURAY.—200 level: During the past week, west crosscut No. 5 has been advanced 20 feet; total length, 290 feet; face in clay and porphyry. On the Sntro tunnel level the joint north drift with the Savags Company has been extended to the Savage north boundary line. This work will now be taken up jointly between the Best & Belcher and this company. We are preparing to start an east crosscut to make connection with our winze, which was run on our south line from the 1600 to the 1900 level. The face of this drift is in hard porphyry.

HALE & NOBACROSS.—We continue retimbering main incline above the 400 level. Main incline.—Are making the necessary repairs. 1400 level.—Are repairing the main north drift on this level. 1800 level.—West crosscut No. 1 from the main south drift was advanced 13 feet; total length, 113 feet; face in quartz and porphyry. West crosscut No. 3 from main north drift was extended 25 feet; total length 315 feet; face in vein porphyry. West crosscut No. 4 from main north drift was advanced 18 feet; total length 157 feet; face in quartz and porphyry.

CHOLLAE.—The north drift from the south line, 550 level, is out 157 feet; face in low-grade quartz. Are retimbering the two north compartments of the main shaft above 930 level. Are repairing the east crosscut, 160 feet south of north line, 930 level.

POTOSI.—South drift, 30 feet back from the face of east crosscut from the Potosi winze, 930 level, is out 25 feet; face is in porphyry and streaks of quartz. South drift from top of raise, 1000 level, is out 117 feet; face is in vein material consisting of soft porphyry and quartz. The north drift from top of raise, 1000 level, is out 68 feet; face in quartz and porphyry containing bunches of good ore. Have finished timbering the station at bottom of Potosi winze, 1500 level, Ward shaft, and have started a north lateral drift. Extracted and sent to the mill the past week 406 tons of ore from the 550, 930 and 1150 levels. Milled during the week 350 tons; on hand at mill, 136 tons and 1250 pounds. Average battery assays, \$25.36. Average car sample assays, \$29.04. Shipped to U. S. Mint, Carson, 485 pounds crude bullion.

BULLION.—The east crosscut, 100 feet north of top of raise from east crosscut, 300 feet south of north line, 1300 level, is out 90 feet; face is in porphyry and quartz. The west crosscut from the northwest drift, 300 feet south of north line, 1800 level of Ward shaft, is out 265 feet; face is in porphyry.

APEX.—Advancing the drift in a northerly direction, parallel with the ledge. Will hire more men as soon as the storm abates. Next week will sink No. 1 winze in the ledge to give it a test.

WARN SHAFT.—The connection from the pressure pipe, 1800 level, to the blowers is about completed. The west crosscut from the northwest drift, 300 feet south of the Bullion north line, 1800 level, is out 265 feet; face in porphyry. Have finished timbering the station at the bottom of the Potosi winze, and have started a north lateral drift.

ALPHA.—The connection from the pressure pipe, 1800 level of the Ward shaft, with the blowers, is about completed.

EXCHEQUEE.—The connection from the pressure pipe, 1800 level, Ward shaft, with the blowers, is about completed.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 5 feet, through hard porphyry; total distance from north line, 47 feet.

KENTUCK.—During the week we have been raising above the seventh floor on 160 level and have extracted some very good ore. The south drift from the Jacket east crosscut on the 1100 level has been extended 21 feet; total length, 76 feet. The face is in ore assaying from \$5 to \$20 in gold.

OCCIDENTAL.—At a point in the main north drift on 750 level, 640 feet from No. 1 winze, we have started an east crosscut in ore giving fair assays. Have also started a crosscut from the bottom No. 2 winze in south drift, 750 level. The Zedig drift, Sntro tunnel level, has been advanced 11 feet, through hard porphyry; total length of main drift, 816 feet.

Tuscarora District.

NAVJO.—*Times-Review*, Feb. 10: Work for the week has been confined to the stopes above the 350-foot level.

BELLE ISLE.—Line crosscut, 250-foot level, has been extended 13 feet in very favorable-looking ground. No change to note in the stopes.

NORTH BELLE ISLE.—The stopes above the north 300 and south 400-foot levels are without material change since last report.

Ferguson District.

APRIL FOOL GROUP.—*Pioche Record*, Feb. 9: A. C. Ellis, one of the April Fool locators at Ferguson, was in town yesterday. He reports that after running 165 feet of the tunnel recently started on the Monitor claim, adjoining the April Fool on the west, the ledge opened and an ore chamber of considerable size was cut into. Since then the walls of the ledge have diverged, and in running ten feet farther, the ore body widened to eight feet and was still improving when he left. Samples taken from about four feet of the ore face carried about six

ounces, or say \$120 a ton in gold, while the remainder of the face is good silver-bearing ore assaying about 50 ounces to the ton. This ledge of the Monitor parallels that of the April Fool claim, and the discovery here is a very important one and may result in active operations again shortly in that part of Ferguson district. In the Petty Hill, south of the April Fool, some prospecting is going on. J. A. Denton and Dan Roeder each have two men at work on two separate claims, and both are said to be looking well.

Pioche District.

YUBA MINE.—Pioche Record, Feb. 9: The ore showing in the nraise from the 1300 level east, in the Yuba mine, referred to two weeks ago, continues to improve. The ore is a heavy lead galena running high in silver, and four cars of first-grade ore are out ready for shipment. Four days ago the work of opening an air passage 80 feet west of the present ore development, and on the same vein, uncovered a foot of ore of the same grade, indicating the chute to run that far west at least. On the west of the shaft the 1300-foot drift has been extended to the vicinity of the old Mazepa working shaft, back of Meadow Valley No. 5. Whether connection will at once be made or not, we have not heard.

A RUMOR.—It is rumored about, but with what certainty we are unable to learn, that work is to be resumed by the Pioche Con. Co. here shortly, and on a general scale. We sincerely hope the rumor may prove entirely true.

Willow Creek District.

ORGANIZATION COMPLETED.—Silver State, Feb. 11: The incorporators of the Caledonia Gold Mining Company completed their organization yesterday by electing T. C. Hanson president, W. H. Kimball vice-president, G. S. Nixon secretary, First National Bank of Winnemucca treasurer and C. B. Hanson superintendent. The mines of the company are located at Willow creek, where a new mill has just been completed and will soon be in operation. The owners of the property are very sanguine over the outlook, and think it will be but a short while before a large amount of bullion will be turned out, and as it will be yellow metal, there is no discount on it.

Yellow Pine District.

LOOKING WELL.—Pioche Record, Feb. 8: The latest news from Yellow Pine and vicinity indicates the feverish interest which was recently manifested in that section to be abating somewhat, though all the mining properties are looking as well and showing up as much ore as ever. The working force at the Keystone, the gold mine of the district so far, has been reduced, 60 days ago, from 20 to but 3 men, who are operating in various parts of the property. The mine itself looks as well as at any time in the past, unless it was at the time the rich pocket was struck in the first working. Ore shipments have been regularly made. Mr. S. T. Godbe, one of the owners and manager of the property, returned there a week ago last Sunday after an absence of two months, and the working force may at once be increased. Prospecting is going on in the other parts of the district, as the means of the owners will permit, and the possibilities of the district as a great ore-producer become steadily more apparent. The main object of interest is the approaching railroad from Goffs. About 60 teams and 100 men are engaged in the work. On January 22d, twelve miles of grade was thrown up and three miles of track laid, the whole work being delayed for want of materials. Water and all supplies have to be brought from The Needles, and this will have to be continued until New York district is reached, as there is no water between the two places. The contract as let requires the road to be completed to New York district, a distance of 30 miles, by the 14th inst., but from a general shortage of supplies and building material this cannot now be done. In all probability, however, this part of the line will be finished by the end of the present month. A gentleman who has just returned from that section says there is no talk there of the road being extended farther this way for the present. The 30 miles of road now in course of construction runs over a very level section of country. Only two water-courses will be crossed in that distance, and neither of these will require bridging, while the largest fill does not reach five feet. Recent reports of prospects there have resulted in an influx of men, the majority of whom are without means, and very many are doing nothing whatever.

Vanderbilt District.

OVERDONE.—Pioche Record, Feb. 8: At Vanderbilt district over 150 men have congregated. Not more than 25 of this number are working for wages, and a very large majority of the remainder are without means. The place with present prospects is said to be badly overdone, though much hope is entertained for the future. The place, though small and of recent origin, already sports two saloons and two stores. It is situated about seven miles from New York district, and 30 miles from the Nevada State line.

DAKOTA.

THE HARNEY PEAK SITUATION.—Deadwood Pioneer, Feb. 8: Another fine specimen of tin ore from the Tenderfoot mine, of the Harney Peak properties, has been placed on exhibition at Russell & Highie's. It will weigh probably ten pounds, and is very rich in black tin. Almost every day brings forth some new evidence of the richness of these properties, and accompanying reasons why the Harney Peak Company cannot be believed to have shut down because they were discouraged. And, in point of fact, the shutdown has every indication of being only temporary, an opinion which would seem warranted by the quiet advice to some of the company's best men to not be in a hurry to get away, but to be pa-

tient and await developments. These quiet hints are said to come from parties who are in a position to know what is going on, and similar words of encouragement have been dropped to some of the Hill City business men. Another favorable feature of the situation is the fact that upward of 75 men are still at work, and that the pumps are kept running in all the mines but the Coats, the pump of which, it is said, is being repaired. There are a good many who look to see operations resumed in March.

ARIZONA.

DOS CABEZAS.—Tombstone Epitaph, Feb. 11: The Cooper mill was started up last week and 25 tons of ore put through it. The tank, which was falling to pieces, has been filled with water. The mill is closed down again for an indefinite period. One of the great necessities of this camp is a large supply of water, which can be stored in the mountains with trifling outlay. Several sites are already being looked at with that idea in view. The Casey Bros. are taking out some very rich ore in their Casey mine, upon which they will realize handsomely.

IDAHO.

THE STAR MINE.—Wood River Times, Feb. 8: The Star mine promises to rank with our best producers. At present very little ore is extracted, because the shaft is being sunk and drifts run to open the mine so as to work it advantageously. But in about 60 days the workings will be connected and stopping will probably be resumed on a large scale. By that time, too, the frost will be getting out of the ground so as to admit of the construction of the concentrating-mill, and the property can then be worked for all it is worth. The present owners of the Star paid \$38,000 cash on account. A second payment of \$25,000 will be due the 7th of April. That is already provided for, and treasury stock, set aside for that purpose on the organization of the company, is offered to pay for the mill.

ORE IN THE WOLFE TONE.—T. A. Starrh, receiver of public moneys at the Hailey Land Office, recently visited the Wolfe Tone mine, on Deer creek, in which he is interested. George Symonds, Charles Hood and Pat Donohue are operating the Wolfe Tone on a year's lease, which will not expire until October 1, 1893. Going to work in the 200 level, at a point about 200 feet in, they made a 70-foot raise, 40 feet of which shows a vein of solid galena, flanked by a varying thickness of second-class ore. The galena is 5 to 12 inches thick, and the lode is six feet wide, with concentrating ore scattered through.

MONTANA.

NEAR PHILIPSBURG.—Mail, Feb. 9: In the fall of the year 1864, Dan and Sandy Brown (two brothers) and Ben Franklin, with one pack animal, cut their way up the Flint Creek canyon and camped where Philipsburg now stands for a few days' needed rest and to make the explorations customary in those days. These pioneers were in search of placer gold, but failing to find that in paying quantities on Flint creek or any of its tributaries, and finding some rich silver float, they concluded to stay with the country until thoroughly explored. That same year the Hope mine was discovered and located by these men, and the following year the Hope Mining Company came into existence, purchasing nearly all of what is now known as Hope Hill, and they have taken out over 2,000,000 ounces of fine silver, as near as can be computed; but never in the history of the company have they been so successful as they have been in the past year. The Hope ten-stamp mill is an old-fashioned, wet-crushing concern, built of stone in 1867, and yet during the month of December, 1892, it turned out about \$120,000, which amount was increased in January, 1893.

THE GRANITE was first located by James Estell, Eli Holland and Dr. J. M. Merrell, by whom it was bonded to Charles Clark. At first this great mine had many ups and downs. By the greatest perseverance and pluck of Mr. Clark, what the experts claimed was a fair granite quarry was found to be the greatest silver mine in the world, and it has yielded a total output of \$32,000,000 and has paid over \$12,000,000 in dividends, and it is to-day probably the richest mining corporation, all things considered, and has more promising undeveloped ground than any other company in the State. The Granite Company has 200 stamps with which to crush the enormous output of ore from its mines, and is now engaged in running a tunnel from Rumsey to its lower workings on Granite mountain. This will crosscut a number of veins at great depth and furnish new evidence that the Flint Creek district as a silver producer has no equal.

THE BIMETALLIC is a continuation of the Granite to the west, and the development of this mine into the great bonanza that it is can also be attributed to the masterly pluck and energy of Charles Clark. The Bimetallic has a 100-stamp mill situated at Clark, one mile and a half from the mine and one-fourth of a mile from Philipsburg, the ore being carried from the mine by a tramway. This company's total product during the few years it has been running is about \$10,000,000, paying in dividends the sum of \$2,140,000, and the mine is but partially developed.

THE TROUT MINE has produced \$1,896,293 in silver. The lowest workings in this mine are 600 feet below the surface, but no stopping has ever been done below the 500-foot level, on which level the ore bodies are on an average of six feet in width and yield an average assay of \$75 per ton silver.

THE PURITAN lies east of the Trout on the same hill, and is rapidly coming to the front as a great producer of silver. The Puritan has always been a mine from the grass roots, and yet if it had not been for the nerve and enterprise of Mr. McKechney, it would probably now be classed as a failure instead of the real bonanza

which it is, having between two levels with but short drifts fully \$50,000 in sight. This property is now in good working shape, and can and undoubtedly will be worked no matter what the price of silver is, as the vein is wide and the first-class ore is of such extraordinary richness.

THE COMBINATION MINE was discovered by Sim Shevely in 1883, and has been continuously worked by the Combination Mining Company since 1888, with one or two brief shut-downs. A 20-stamp mill reduces the ore, and the company gives employment to about 400 men, and this with the other smaller owners, leasers and prospectors incident to a mining camp, makes Combination a busy, prosperous little town, with a population larger than some counties. The company has produced since June 1, 1888, 1,194,933.19 fine ounces of silver, and the mine never looked as well as it does at present.

OTHER PROPERTIES.—There are many other very promising properties under course of development within a few miles of Philipsburg, and notwithstanding the low price and uncertain future of silver, there seems to be no let-up by owners of good-looking prospects and partially developed mines. All things considered, there never was a brighter outlook for the Flint Creek district in a mining way than there is at present, and for many, many years to come the product of her mines would support a kingdom.

OREGON.

WHITE SWAN BULLION.—Bedrock Democrat, Feb. 6: The White Swan mine is again to the front with its regular output of gold bullion. Yesterday Mr. G. S. Tarbell, manager, arrived in town and deposited in the Baker City National Bank \$6000 for shipment to the mint. This sum was the output of the White Swan mine during a period of 12 days, a part of which time ten stamps were running. Let's see; \$6000—12 day's run—Why that's \$500 per day.

MORE BONANZA GOLD.—Bedrock Democrat, Feb. 6: The Bonanza mine still proves its wealth in its continual output of gold brought to this city at short intervals, notwithstanding the hindrances and setbacks consequent upon deep snows, poor roads and scarcity of water supply to run the batteries of the reduction plant on the property. Yesterday Mr. Albert Geiser, manager of the Bonanza, arrived in the city and deposited at the First National Bank upward of \$3000 in gold bullion, the result of a short run and obstructed somewhat by the work necessary in putting in a new boiler at the mill which is now in place. The bullion will be forwarded by the bank to the United States mint to-day.

SOUTH DAKOTA.

CONDITION OF THE HARNEY PEAK COMPANY.—Black Hills Times, Feb. 9: The directors of the Harney Peak Company officially publish the following as the condition of affairs of the company: That the capital stock of said corporation is \$15,000,000, which has all been issued as full-paid stock for the purchase and development of mining property in the Black Hills, South Dakota; that the indebtedness of said company is as follows: First bonded debt and interest, \$126,970; mortgage to be secured by issue of bonds under contract \$4,850,000; current accounts, including bills payable not exceeding \$165,000, and that said company has not paid any dividends and has not yet realized any profits upon its business.

UTAH.

A BIG CAVE.—Park Record, Feb. 11: A cave of monster proportions occurred in the Ontario mine Saturday evening at 8:30 o'clock, and when the noise and confusion occasioned by the giving away of such an immense amount of earth had subsided, the miners at once began an active search for the men working in the stope adjacent to the cave. Though many narrow escapes were reported, all the stopers were found safe and uninjured with the exception of John McFarlane, of whom no trace could be found. The unfortunate man had been working in a stope about three sets below the 600 level, and as the whole works in that vicinity had been carried down, it was at once surmised that he had gone down with the avalanche and been buried alive. The cave was about 60 feet in length and extended from the 600 to 700 level, embracing a tremendous amount of waste rock and earth that had been stored away in worked-out stopes to save the expense of hoisting. The trouble was precipitated by the giving away of some timbers near the 700 level. The weight had steadily increased until it became more than the timbers could stand, and as is often the case under like conditions, gave way almost without warning. The great rush of rock completely blocked the 700 level and affected the stopes below for a distance of several sets of timbers. The extent of the cave and the damage done was at once explored by the miners, and several men were found in very uncomfortable quarters.

PARK NOTES.—Jerry Richardson closed down his concentrator in Thayne's canyon Thursday last and will not start up again until spring. Late news concerning the Daly West credits that property with improving with each day's work performed. There is now no question as to the future of that valuable property. The Silver King is now practically idle, as only a few men are being worked. Sufficient depth has been obtained on the Meers, and drifting to the vein is now being pushed as rapidly as possible. It is stoutly intimated that a big strike may be expected in this property in the near future. The leasers on the Steele group are making a good showing and the drift they are now driving on the vein looks very promising. The indications are favorable for a big strike in this property during the coming summer. The Daly West has recently encountered considerable water, and it is taxing the pumps to their utmost to keep it down. The work of driving the drift to make connection with the Daly to secure a drain through the Ontario 600 tunnel is being rushed as fast as possible.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING FEB. 7, 1893.

- 491,403.—GAS ENOINE.—J. S. Biggar, Whitesborough, Cal.
- 491,464.—SUBOICAL FORCEPS.—C. E. Blake, Sr., S. F.
- 491,269.—FRUIT PICKER AND PRUNER.—J. H. Griswold, Oakland, Cal.
- 491,172.—SUSPENDED CHAIR.—M. A. Hart, Scribner, Cal.
- 491,427.—FLY CATCHER.—G. D. Horton, Snohomish, Wash.
- 491,354.—LAWN SPENKLER.—J. Jett, Walla Walla, Wash.
- 491,358.—MAP OR CHART STAND.—J. H. Kaufman, Marysville, Cal.
- 491,194.—SEWING-MACHINE ATTACHMENT.—Rachel A. Shellard, Virginia, Nev.
- 491,384.—DAMPER REGULATOR.—P. & J. St. Mary, S. F.
- 491,396.—KILN.—P. L. Youngren, Oakland, Cal.

The following brief list by telegram, for Feb. 14 will appear more complete on receipt of mail addresses:

San Francisco.—Hans C. Behr, variable transmitting gear; Charles E. Blake, dental forceps, six; John W. Raymond, gas engine, California—George H. Abel and J. W. Bayle, Maxwell, heading and reaping machine; Peter O. Andreason, Ferndale, butter-mold and cutting machine; John E. Armstrong, Santa Cruz, latch and lock; Charles Bizi, Selma, cultivator; Frank E. Brown, Los Angeles, coffee uro or like vessel; George Diez, Santa Clara, peocil sharpener; J. E. Evans, J. Gillespie, San Jose, paper-holder and cutter; George Rice, Vallejo, horse detach; Joseph Fisher, Los Angeles, fishing reel, Washington—George A. Stine, Spokane, sod planter; William W. Swank, Seattle, car coupling.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business, for Pacific Coast inventors transacted with perfect accuracy, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

STEP-LADDER.—Samuel R. Smith, Colusa, Cal. No. 490,991. Dated Jan. 31, 1893. The object of this invention is to provide an improved step-ladder which is especially useful for fruit-picking and other similar work, and its object is to give the ladder a firm base, any desired spread of said base, and a means for absolutely locking it at any point to which it may be adjusted.

ROPE-LEADER FOR WINDING DEUMS.—Norton H. Pine, Eureka, Humboldt Co., Cal. No. 490,934. Dated Jan. 31, 1893. This consists in a mechanism whereby a rope is caused to wind evenly from one end of the drum to the other, to prevent overriding and injury, and in an automatic means for reversing the movement of the leader upon reaching either end of the drum.

BICYCLE BELL.—Lewis E. Ericson, S. F. No. 491,012. Dated Jan. 31, 1893. This invention relates to that class of bells for bicycles or other velocipedes in which the sounding of the bell is due to frictional contact of the wheel of the machine with power-transmitting connections. The invention consists essentially in an oscillatory plate or disk carrying the striker and operating mechanism therefor, said plate or disk by its movement being adapted to throw its striker-operating mechanism into and out of engagement with the bicycle wheel to actuate it or allow it to remain at rest. This bell can be readily adjusted to the machine and thrown into or out of action with ease and rapidity.

WRAPPING-MACHINE.—Ira R. Hutchinson, Fresno, No. 490,608. Dated Jan. 24, 1893. The invention relates to that class of machines for wrapping articles of merchandise in which swinging flaps are employed to lay the folds of the paper in place about the article. The object of the invention is to provide a simple and rapidly operating machine for wrapping all kinds of articles of merchandise, but specially adapted for the wrapping of caramels.

CONTINUOUS KILN.—Peter L. Youngsen, Oakland, No. 491,396. Dated Feb. 7, 1893. The object of this invention is to provide a kiln of such construction that the heat may be advanced and the bricks or ware dried and burned in the lower part of the compartment as well as in the top part of it, a result which is found impossible in other kilns of this type; and also provide for a perfect combustion of the fuel in the bottom portion of the kiln.

20-Stamp Mill for Sale.

In Southern California, a 20-stamp Gold Quartz Mill, with engine, boiler, self-feeders, rock-breaker, etc. As the premises are adjacent to railroad, the Mill could be conveniently removed. Can be had at low price for cash. Address "Quartz Mill," care MINING AND SCIENTIFIC PRESS, San Francisco.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on the track of the Atlantic & Pacific Railroad. They contain a first-class fisher-power engine and 45-horsepower boiler, with Ore-crusher and other machinery, Mill scales, Assaying outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to JOHN H. GILLESBY, 1214 Stockton st., San Francisco.

Market Reports.

The Markets.

SAN FRANCISCO, Feb. 16, 1893

Special correspondence of the New York Financial Chronicle, under date of London, January 21st, contains the following reference to the silver market.

The Silver Market.

The price of silver continues to fluctuate about 38 1/2 per ounce, and there is a decidedly better feeling in the market. The demand for India is very strong. Very large amounts have been sent thither during the past few weeks, and the Indian banks are now buying even for a fortnight forward. The India Council, too, is selling an exceptionally large amount of bills; indeed, its sales are larger than they have been in January for eight years. On Wednesday of this week as much as 55 lakhs were disposed of. The firmness is largely due to the interruption of mining and railway communication in the United States through the bad weather, and to the hope that the Sherman Act will not be so soon repealed as was feared.

The journal above mentioned contains a review of the world's gold and silver production for a series of years. The most significant point deduced from the facts presented is that the price of silver has dropped low enough to affect the yield, and that the final summing up for 1892 will show a falling off for production in the United States. The Chronicle thinks there is pretty conclusive proof that silver production in the United States has reached a point where the average mine in all the States has become unproductive, and that under the present quotations for bullion "our contributions hereafter will be a declining factor in the world's aggregate supply." Continuing, the same journal says:

Of course, it is possible and even probable that there will be rich districts discovered and new veins struck in the future; but the silver-bearing sections have now been so searched over by individuals, cut through by railroads, and forced to their production by modern methods and appliances, it is reasonable to anticipate that hereafter new discoveries will grow more and more infrequent, and new methods of mining and refining by a very temporary resource for increased production.

The World's Gold and Silver.

M. L. Muhleman, acting assistant treasurer of the United States Sub-Treasury in New York, is credited with the following statement of the quantity of gold and silver in the world on the 1st of January:

	Gold.	Silver.
France.....	\$1,000,000,000	\$700,000,000
United States.....	650,000,000	590,000,000
Germany.....	530,000,000	145,000,000
Great Britain.....	510,000,000	110,000,000
Russia.....	280,000,000	60,000,000
Italy.....	120,000,000	60,000,000
Spain.....	100,000,000	125,000,000
Austria.....	75,000,000	100,000,000
India and China.....		1,790,000,000
Totals of above.....	\$3,265,000,000	\$3,390,000,000
Other countries.....	635,000,000	310,000,000
Aggregate.....	\$3,900,000,000	\$3,900,000,000

The above is said to be a conservative estimate. We are not so certain about that. Apart from the money actually in Government vaults and in the banks, it is a difficult question to state the amount in any country. The silver is put in at its parity with gold on the basis of 60d per ounce, whereas it is worth less than 40d per ounce from a commercial standpoint as measured in gold. It is a little singular that the metals should be so accurately divided. The amount credited to the unspecified countries includes Belgium, Holland, the Scandinavian Union, Switzerland and Austria.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.....	@ 13 1/2	English, do.....	@ 18
BORAX.		Oatmeal tool.....	@ 8 1/2
Refined, in car lots.....	@ 7 1/2	8 1/2 Diam'd tool.....	@ 15
Powdered, do.....	@ 7 1/2	Pick & Hammer.....	@ 10
Crushed, do.....	@ 6 1/2	Machinery.....	@ 5
All grades jobbing at advance.		Tool Calk.....	@ 4 1/2
COPPER.		TIN PLATE.	
Bolt.....	@ 22	B. V. steel grade.....	@ 5 3/4
Sheeting.....	@ 22	14x20, spot.....	@ 5 3/4
Ingot, jobbing.....	@ 14	Charcoal, 14x20.....	@ 5 3/4
Do, wholesale.....	@ 13 1/2	Do roofing, 14x20.....	@ 5 3/4
Fire Box Sheets.....	@ 24	Do, do, 20x28.....	@ 11 7/8
IRON.		PIG TIN.	
Bar, base.....	@ 3	Spot @ B.....	@ 24
Norway, base.....	@ 4 1/2	COAL.	
PIG IRON.		SPOT FROM YARD-PER TON.	
Eglington, 20 ton.....	Spot.	Wellington.....	\$8 00
Glenbrook.....	21 00	Greta.....	7 50
Am. Bolt, No. 1, 22 00.....		Nasau.....	6 50
Oregon Pig.....	@	Gilman.....	6 00
Puget Sound.....	20 00	Seattle.....	6 50
Clay Lane White.....	22 00	Ocos Bay.....	5 50
Langdon.....	22 50	Channel.....	5 50
Thorncliffe.....	23 00	Egg hard.....	12 00
Gartbarrie.....	22 50	Umberland, in sacks.....	16 00
Garroth.....	22 50	Do, bulk.....	14 00
CHROME IRON ORE.		Walsend.....	7 25
Per ton.....	@ 10 00	Seckel Split.....	7 50
LEAD.		Brymbo.....	7 50
Pig.....	@ 4 1/2	West Hartley.....	8 00
Bar.....	@ 5	TO LOAD-PER TON.	
Sheet.....	@ 7 1/2	Austral.....	5 50
Pipe.....	@ 6 1/2	Liverpool Steam.....	6 50
DRY, sizes smaller than B, 1/2 of 25 lbs.....		Scotch Split.....	7 00
Do, B, 1/2 of 25 lbs.....		Oardiff.....	6 75
Do, B, 1/2 of 25 lbs.....		Leigh Lupin.....	11 00
Do, B, 1/2 of 25 lbs.....		Umberland.....	10 00
Do, B, 1/2 of 25 lbs.....		Egg, hard.....	10 00
Do, B, 1/2 of 25 lbs.....		West Hartley.....	7 50
Do, B, 1/2 of 25 lbs.....		COKE.	
Do, B, 1/2 of 25 lbs.....		English, to load.....	\$8 50 @ 9 50
Do, B, 1/2 of 25 lbs.....		Do, spot, in bulk.....	@ 9 50
Do, B, 1/2 of 25 lbs.....		Do, in sacks.....	@ 11 50
Do, B, 1/2 of 25 lbs.....		Umberland.....	9 00 @
QUICKSILVER.		SILVER.	
Home trade, pr.....	41 50 @ 42 00	London.....	83 1/2
Bank.....	35 50 @ 36 00	New York.....	83 1/2
For export.....	35 50 @ 36 00		

Eastern Silver Markets.

NEW YORK, Feb. 9.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.
Thursday.....	83 1/2	83 1/2
Friday.....	83 1/2	83 1/2
Saturday.....	83 1/2	83 1/2
Monday.....	83 1/2	83 1/2
Tuesday.....	83 1/2	83 1/2
Wednesday.....	83 1/2	83 1/2

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED, DELINQ. AND SALE.	SECRETARY.
Andes M Co, Nevada.....	39.....	250.....	Jan 21, Feb 21, March 16.....	J W T Laga, 309 Montgomery
Bainbridge Placer & Gold M Co, California.....	1.....	40.....	Jan 28, March 8, April 5.....	R George, 419 California
Belcher M Co, Nevada.....	45.....	500.....	Feb 8, March 14, April 4.....	O L Parker, Mills Building
Belle Isle M Co, Nev.....	17.....	100.....	Jan 9, Feb 14, Mar 5.....	J W Pew, 310 Pine
Best & Belcher M Co, Nevada.....	33.....	200.....	Jan 16, Feb 21, March 14.....	L Osborn, 309 Montgomery
Bodie Cons M Co, California.....	16.....	250.....	Feb 13, March 24, April 17.....	H D Walker, 309 Montgomery
Calcutta M Co, Nevada.....	45.....	100.....	Jan 23, March 2, March 23.....	A S Groth, 419 California
Challenge Cons M Co, Nevada.....	14.....	200.....	Feb 11, March 16, April 6.....	C L McCoy, Mills Building
Consolidated G M Co, California.....	13.....	500.....	Feb 7, March 17, May 2.....	T Wetzel, 309 Sansome
Crocker M Co, Arizona.....	1.....	100.....	Jan 16, Feb 21, March 15.....	A Waterman, 310 Pine
Crocker-Mack M Co, California.....	3.....	100.....	Jan 6, Feb 10, March 3.....	J W Pew, 310 Pine
El Leopoldo M Co, Mexico.....	3.....	50.....	Jan 26, March 4, March 28.....	J Hines, 214 Pine
Eschschuer M Co, Nevada.....	33.....	100.....	Jan 26, March 1, March 23.....	C E Elliott, 309 Montgomery
Gold & Norcross M Co, Nev.....	13.....	500.....	Jan 7, Feb 10, Mar 3.....	A B Thompson, 309 Montgomery
Independence M Co, Nevada.....	18.....	50.....	Jan 27, March 6, March 26.....	J W Pew, 310 Pine
Jackrabbit M & M Co, Nevada.....	2.....	50.....	Dec 29, Feb 6, Feb 13.....	T Wetzel, 320 Sansome
Justus M Co, Nev.....	53.....	10.....	Jan 6, Feb 9, Mar 2.....	R O Kelly, 419 California
Martin White M Co, Nevada.....	26.....	250.....	Jan 2, March 2, March 30.....	K L Ross, 120 Sutter
Moran M Co, California.....	16.....	100.....	Jan 28, March 6, March 26.....	J C Breese, 239 Montgomery
Nasau M Co, Nevada.....	24.....	100.....	Jan 9, Feb 13, March 7.....	J W Pew, 310 Pine
Nasau Queen M Co, Nevada.....	8.....	100.....	Jan 23, Feb 27, March 20.....	R R Grayson, 331 Pine
North Belle Isle M Co, Nevada.....	22.....	100.....	Jan 20, March 3, April 3.....	J W Pew, 310 Pine
North Commemorative M Co, Nevada.....	4.....	100.....	Jan 2, March 2, March 30.....	J W Pew, 310 Pine
Overman M Co, Nevada.....	65.....	250.....	Jan 10, Feb 14, Mar 7.....	G D Edwards, 414 California
Peer M Co, Arizona.....	14.....	50.....	Jan 20, Feb 24, March 21.....	A Waterman, 309 Montgomery
Peerless M Co, Arizona.....	19.....	50.....	Jan 20, Feb 24, March 22.....	A Waterman, 309 Montgomery
Best Belcher & Miles M Co, Nev.....	11.....	250.....	Jan 5, Feb 7, Feb 27.....	E B Holmes, 309 Montgomery
Silver Hill M Co, Nevada.....	32.....	50.....	Feb 14, March 21, April 11.....	D C Bates, 309 Montgomery
South Fork Cons M Co, Nevada.....	2.....	200.....	Jan 4, Feb 10, Mar 6.....	A Halsey, 328 Montgomery
Seaton M Co, Arizona.....	8.....	50.....	Jan 16, Feb 20, March 14.....	A Waterman, 309 Montgomery
West Cons Virginia & Cal, Nevada.....	1.....	250.....	Jan 19, Feb 23, March 15.....	P H Andros, 324 Pine

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Indian Creek L & M Co.....	Annual.....	8 Mills, Mills Building.....	March 7
Nasau Water & M Co, Nevada.....	Annual.....	J H Ward, 508 California.....	Feb 20
Pacific Coast Porax Co, California.....	Special.....	A H Clough, 103 Sansome.....	Feb 18
Ralph Bank Quicksilver M Co, California.....	Annual.....	T Wittingham, 306 California.....	Feb 20
Watt Blue Gravel Co, California.....	Annual.....	G A Benton, 323 Montgomery.....	Feb 20

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.....	5.....	L Osborn, 309 Montgomery.....	Oct 20
Champion M Co, California.....	10.....	T Wetzel, 310 Pine.....	Dec 19
New York M Co, Nevada.....	10.....	D R Elliott, 319 Pine.....	Feb 15
Great Western Quicksilver M Co.....	25.....	A Halsey, 328 Montgomery.....	Oct 8
Mayflower Gravel M Co, California.....	25.....	D M Kent, 330 Pine.....	Dec 20
Pacific Coast Borax Co, California.....	1 00.....	A H Clough, 330 Montgomery.....	Jan 10
Standard Cons M Co, California.....	10.....	J W Pew, 310 Pine.....	Dec 23

Mining Share Market.

This has been a very dull week in mining share circles, business being light and prices low. The principal matter of interest in connection with the Comstock situation is the meeting held on Wednesday to talk over the proposition to pump out the lower levels. Those present were John W. Mackay, D. O. Mills, J. L. Flood and Samuel L. Jones. It is stated that they practically agreed to start pumping again. Mr. Mackay said: "The subject has been under discussion for some time, but no definite plans put forth. It is a gigantic undertaking and would require a vast outlay of capital, and before it is finally decided upon we must be sure of our ground. In a few days there will be a meeting of those most interested, and at that time it is more than probable that something will be finally done looking toward the reopening of the great mines."

It is understood that the project as outlined is to pump out the lower levels and undertake the further development of the properties lying along the slope of Mt. Davidson.

The upper drifts have all been pretty generally worked out. At the bottom of the huge shafts the water has been allowed to accumulate, and as it is in that direction only that further discoveries can be hoped for, the men who have the controlling voice have about decided to make one last effort, knowing that another strike would not only bring back to the mines the old value but would give to Virginia city a new lease of life. In order to accomplish the task, of course, a great outlay of capital would be required and the chance of failure risked, but engineers who have looked into the matter are of the opinion that there is every chance for the uncovering of another bonanza something like the one of 1874. They confess that it is the only chance to make the mines prosperous again, and for that reason they are apparently willing to make the venture.

William S. Lyle, one of our old and best-known mining operators, has resigned as president and director of the Peerless, Crocker, Weldon and other Qujiotoa mining companies with which he has been connected since their organization, and also intends to resign as director of other mining corporations in the Nevada block. Mr. Lyle says he has done this so as to devote all his time and attention to the development of a group of valuable gold mines in Vanderbilt district, San Bernardino county, in which he and other large capitalists are interested. It is understood that these properties are under the patronage of the bonanza firm. The best wishes of a host of friends will go with Mr. Lyle in his new undertaking. George Wallace has been elected president of the Qujiotoa companies to fill the vacancy caused by Mr. Lyle's resignation.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, Feb. 2, 1893.	
9:30 A. M. SESSION.	
300 Belcher.....	75c 100 Mexican.....
200 Chollar.....	50c 100 Potomac.....
200 Con. Cal. & Va.....	2 35 900 Savage.....
100 Crown Point.....	55c 350 Union.....
100 Hale & Norcross.....	1 15 400 Yellow Jacket.....
100 Kentuck.....	20c
2:30 P. M. SESSION.	
100 Best & Belcher.....	1 50 500 Opbr.....
200 Bullion.....	60c 200 Potomac.....
100 Con. Cal. & Va.....	2 35 150 Utah.....
100 Hale & Norcross.....	1 20 500 Yellow Jacket.....
100 Mexican.....	1 65 15

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSION.	
100 Alpha.....	15c 300 Crown Point.....
100 Andes.....	15c 50 Hale & Norcross.....
50 Best & Belcher.....	1 55 300 Justice.....
500 Bullion.....	1 50 200 Mexican.....
100 Bullion.....	55c 100 Overman.....
100 Bullion.....	60c 500 Potomac.....
200 Cal. donia.....	7c 350.....
100 Challenge.....	25c 1000.....
500 Chollar.....	50c 300 Scorpio.....
100 Con. N. Y.....	30c 550 Yellow Jacket.....

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

SOLIO GOLO M. Co. Capital stock \$10,000,000. Directors: Martin White, W. C. Taddfield, F. Stadelidt, Jr., John M. Klein and E. C. Weber.

ALASKA PACKERS ASSOCIATION. The object is to catch, can, pack and salt fish in Alaska. The principal business of the corporation is to be transacted in this city. Directors: Sidney M. Smith, Henry F. Fortman, S. B. Peterson, E. B. Pond, George W. Hume, Charles Hirsch, E. B. Beck, Isaac Liebes and H. A. Williams, all of this city. The capital stock is \$5,000,000, divided into 50,000 shares.

GERMANIA INVESTMENT ASSOCIATION. Object, to encourage the systematic saving and investment of small sums. Directors: F. J. Hund, Arthur C. Drewitz, Julius Sievert, C. C. Henke, Henry Franzen, Otto A. Deicke, P. G. G. Kunze, August Birch and Charles Streich-r. Capital stock, \$1,500,000, divided into 5000 shares.

HUME CANNERY AND TRADING CO. The company is authorized to do business in California, Oregon, Washington and Alaska, and will engage in the canning of fish.

The capital stock is \$100,000, of which \$95,000 is fully paid up. The principal stockholder is R. D. Hume of Gold Beach, Washington, who holds 74-000 of the stock.

ALHAMBRA SHOE MANUFACTURING COMPANY, Alhambra, Los Angeles county. Capital stock, \$25,000. Directors—Milton Johnson, G. B. Johnson, F. E. Gray, J. M. Elliott and J. A. Green.

CALIFORNIA FISHING COMPANY. Capital stock, \$50,000. Directors—W. C. Knox, C. J. Webster, Frank Piper, G. C. Knox and George H. Perry.

CALIFORNIA GRAPE FOOD COMPANY. Capital stock, \$100,000. Directors—R. E. Wood, S. M. Tomblin, R. W. Gaff, G. C. Pratt and Seth Mann. GAVER CREAMERY COMPANY, Valley Ford, Sonoma county. Capital stock, \$5,000. Directors—A. P. Gaver, John Robertson, Walter Jones, H. M. Le Baron and C. Gambini.

THE HUMALOT ELECTRIC LIGHT AND POWER COMPANY, Eureka, Humboldt county. Capital stock \$50,000. Directors—James Armstrong, Josiah Bell, S. A. Vance, J. M. Melindy and William V. Cockwood.

CALIFORNIA STARCH COMPANY, Petaluma, Sonoma county. Capital stock, \$20,000. Directors—J. M. Striening, E. C. Austin, John Burkart, H. I. Summerhayes, W. J. Adams, W. S. Pierce and F. A. Wickersham.

RED POINT GOLD MINING COMPANY. Capital stock, \$1,000,000. Directors—I. M. Requa, J. H. Smith, F. H. Hall, G. C. Hickox and H. M. Campbell.

COPELAND PACIFIC TANNING COMPANY, Anderson, Shasta county. Capital stock, \$300,000. Directors—John W. Copeland, Isaac Atwood, S. E. Smith, Robert D. Baird and Thomas B. Smith.

THE largest cannon manufactured by the great German gun-maker, Krupp, it is reported, weighs 270,000 pounds. The calibre of this monster hostile engine is 19 1/4 inches and the barrel is 44 feet long. The greatest diameter of the gun is six and one-half feet, and the range of fire is about 12 miles. The projectile is four feet long, weighs 2,700 pounds, and is fired by a charge of powder weighing 70 pounds.

In the manufactures of Great Britain alone the power which steam exerts is estimated to be equal to the manual labor of 4,000,000 of men, or more than double the number of males supposed to inhabit the globe.

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L. PETERSON. MODEL MAKER, 228 Market St., N. E. cor. Front (up stairs) San Francisco. Experimental machinery and all kinds of models. Tin and brasswork. All communications STRICTLY CONFIDENTIAL.

Assessment Notices.

FALL RIVER CONSOLIDATED GOLD QUARTZ MINING COMPANY. LOCATION OF principal place of business, San Francisco, Cal. Location of works, Plumas County, Cal.

Notice is hereby given, that at a meeting in the Board of Directors, held on the 3d day of February, 1893, an assessment (No. 10) of two cents (2) per share, was levied upon the capital stock of the corporation, payable immediately in U. S. Gold Coins, to the Secretary, at the office of the Company, 313-315 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 23d day of March, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of April, 1893, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors, ADOLPH LORSBACH, Secretary. Office, 313-315 Front St., San Francisco, Cal.

SUPERIOR MILL AND MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Placerville, El Dorado County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 15th day of February 1893, an assessment (No. 1) of five cents (5c) per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, Room 2, No. 323 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 20th day of March, 1893, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 5th day of April, 1893, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors, I. N. WITHROW, Secretary pro tem. Office, Room 2, No. 323 Front St., San Francisco, Cal.



Zn., Copper or Brass Screens for all purposes. Cal. 100 lbs. Perforating Screen Co. 145 & 147 Beale St., S. F.

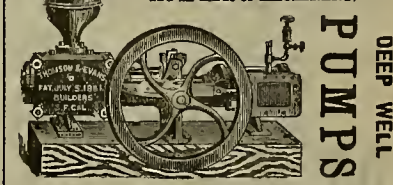


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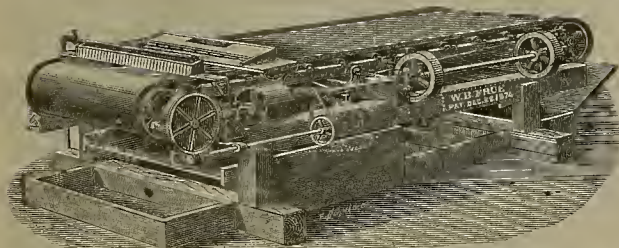
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 " " " Improved Belt Frue Vanner 800, f. o. b.
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 CAJALCO, Dec. 13, 1891.

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 I am, my Dear Sirs, Yours faithfully,
 S. HARRIS, Manager

For any information, or for pamphlets, or for circulars or testimonials, call on or address

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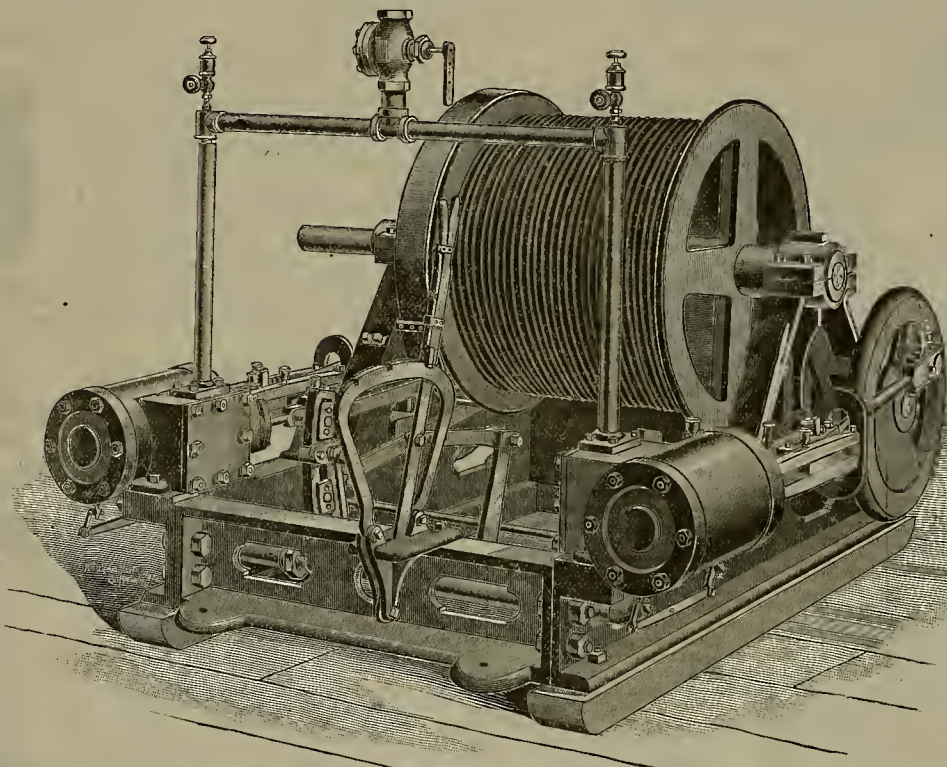
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 tachments,
 Copper-Smelting Works,
 Lead-silver Smelting Works.
 Water Jacket Smelting Fur-
 naces,
 Roasting Furnaces,
 Chlorination Works,
 Gold Stamp Mills,
 Concentrating Mills,
 Ore Stamping Machinery,
 Talloch Concentrators,
 Rand Rock Drills and Com-
 pressors,
 Sullivan Diamond Drills,
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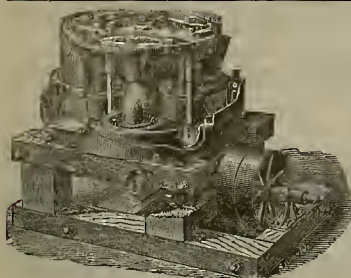
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVI. — Number 8.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 25, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Mining Bill.

Both branches of Congress have adopted the Conference Committee's report on the Caminetti bill and it has gone to the President for his signature. It is probable that by the time this copy of the PRESS is in the hands of its readers the bill will have become a law. The modifications to the penal clause, noted by us last week, were adopted, as they should have been in the first place. The penal

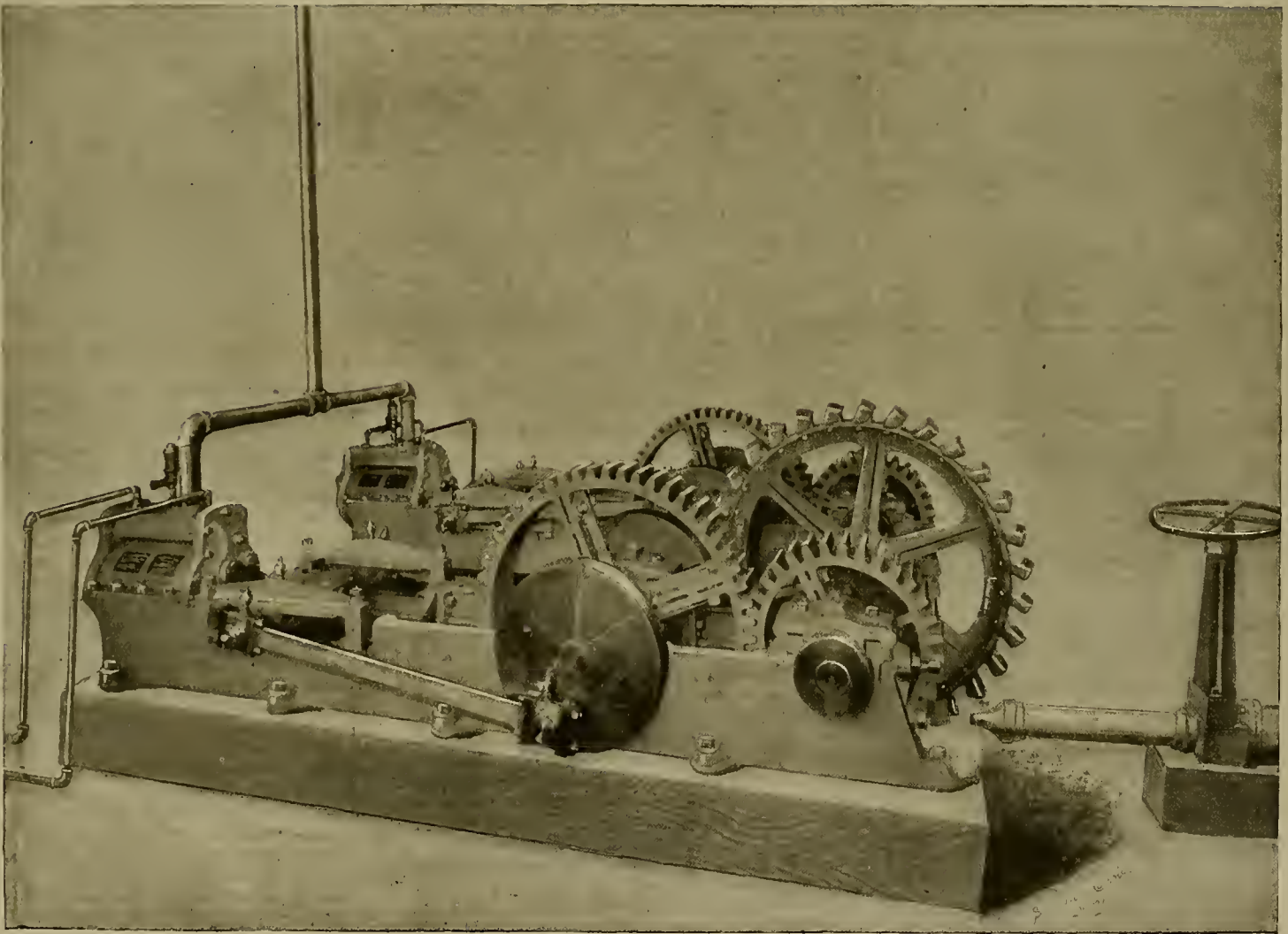
would have been almost prohibitory to the industry if the Miners' Association had not blocked some little games toward the end of the proceedings in Congress.

The Bond Not Sufficient.

On another page is given the text of the decision of the Supreme Court with regard to the sufficiency of the bond filed in the suit of M. W. Fox vs. the Hale & Norcross

judgment of the Superior Court. The "mill-ring" people must have found out by this time that the Mining Stock Association means business, as it is persistent in its litigation and meets every move of those who have made money illegitimately out of the mines. The decision is another victory for the Association.

WATER-WHEEL AND AIR COMPRESSOR.—The adaptation of the Pelton water-wheel directly to the main shaft



INGERSOLL-SERGEANT DUPLEX GEARED AIR COMPRESSOR DRIVEN BY PELTON WATER-WHEEL ON MAIN SHAFT.

clause is restricted to apply only to such mines as may injure navigable streams. This, in truth, is all the Government has any interest in. If no navigable streams were injured it would be none of the Government's business at all.

The Legislature adopted a resolution asking the President to sign the bill, and there was not a dissenting vote in the House, which is somewhat remarkable. It has been a long fight to get this bill through, and it is not by any means all the miners hoped for. However, it legalizes the hydraulic-mining industry, under fixed conditions, and miners will have to deal with an intelligent, unbiased body of engineers, instead of a very different class of people. The bill is better than no legislation at all, but

Mining Co. As will be remembered, some time ago Judge Hebbard gave judgment against the defendants for over a million dollars. They gave notice of appeal and filed a bond with a guaranty company as security. This company was a new one and, it has been openly charged, was only formed to give this bond. The Supreme Court holds in brief that the Legislature never intended that a corporation with a paid-up capital of \$100,000 should be accepted as surety on a bond or undertaking in an amount many times in excess of its capital, and that the solvency and responsibility of the stockholders in the corporation could not affect the question. Under this decision the appeal to the Supreme Court does not stay the proceedings which have been or may be taken by the plaintiff to enforce the

of the Ingersoll air compressor is a feature of economy well adapted to the utilization of mountain streams where a height or head of from 50 to 1000 feet may be obtained. The lower heights have their power doubled by using the double nozzles and are now running at a mine in Peru, S. A. The engraving shows a sectionalized duplex Ingersoll plant, all made for mulehack transportation when so desired.

THE directors of the Denver Mining Exchange have fixed the list fee for 1893 at \$50 and the annual calling fee at \$25. A committee has been appointed to secure new properties on the Board. After March 15th no stock will be called that has not complied with the rules.

MINING AND SCIENTIFIC PRESS.

BY THE DEWEY PUBLISHING CO.

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	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	\$.25	\$.50	\$ 1.20	\$ 4.00
Half inch (1 square).....	1.00	2.50	6.50	22.00
One inch.....	1.50	5.00	13.00	42.00

MINING NOTICES.

Assessment Notices.....	\$10.00
Delinquent Notices, per square.....	3.00
Large advertisements at favorable rates. Special or reading notices, legal advertisements notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.	

W. B. EWER, }
 CHAS. G. YALE, } EDITORS

Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, February 25, 1893.

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Comment.

It is stated that after the committee of managers and superintendents of Comstock mines has obtained the desired information concerning the cost of deep pumping operations, the miners' unions of Gold Hill and Virginia City will be asked to submit to a reduction in wages, which are now \$4 a day, and that the railroad, wood and water and other interests will be requested to make corresponding reductions, so as to offset the cost of pumping. It is said there is to be a proposed graduation of wages; that is, the men working very deep will be paid more than those working in the upper levels. The deep mining work in the heated portions of the mine is more arduous than that above. The miners should be reasonable in meeting this proposition, and not add labor troubles to the difficulties which already exist. It is not probable that any unreasonable demands will be made, but unless expenses are reduced all around, Comstock mining cannot prosper. The miners should wait for the proposition, whatever it may be, and give it careful consideration; but an absolute refusal in advance, of any reduction of wages, would, in all probability, bring the whole scheme of deep pumping to an end. If the miners leave there for most other camps, they will only get \$3 a day, so they can afford to treat with the managers unless some unreasonable demand is made.

The bond on the gold mines in Vanderhilt district, San Bernardino county, which W. S. Lyle and others secured for the honoza firm, has been taken up. The amount paid to the original owners is \$40,000. Messrs. Mackay, Flood and others, who now control the group, will expend about \$100,000 in developing the properties. Mr. Mackay himself, while on the coast, will visit these mines. If satisfied with them, it is said that the stocks of the companies to be incorporated will be listed on the stock boards in this city. This will be the first time the Nevada silver-mining millionaires have turned their attention to California gold mines, and it is characteristic of them that they should begin in the greatest silver-producing county of the State. They also take up an entirely new district in which to begin their operations. It is to be hoped that they have good properties, as there are plenty of good gold mines in California. Outside of those at Bolie, however, few of them have ever been listed on the boards for speculative purposes.

On another page is the first one of a series of articles by C. H. Aaron on silver-milling by amalgamation. Mr. Aaron's idea is to present some points not to be found in the standard works, but which are learned by experience.

As a general thing, millmen and "experts" keep such points to themselves as part of their professional equipment. These people are usually willing to absorb information, but seldom like to impart it. The younger men, who are more candid, have little to impart, while the older and more experienced keep what they know to themselves. Mr. Aaron is on exception to this. Not only has he written several books, but his contributions to the public press have been numerous. His writings are of a practical nature, and he possesses a faculty of making himself very clearly understood, so that any one may carry out easily what he describes. Those interested in the metallurgy of silver will find much of interest in the series of articles now running in the MINING AND SCIENTIFIC PRESS.

We were shown this week some pyritic ore from the Kennedy mine, of Amador county, in which the sulphurets were plainly gilded with a thin veneer of gold. The sulphurets look like those of ordinary nature, but the free-gold coating is apparent under a microscope. If stamped fine all this gold is lost, as it extremely fine and thin. If split up, the pyritic matter shows gold on the divisions in a thin film. It really looks as if the gold on the surface had been thinly gilded on. Fine stamping of such material cannot be done except with great loss. This peculiar ore is from the 1500-foot level of the Kennedy.

Mr. Kennedy's bill to turn the Mining Bureau over to the State University has been practically killed, one of the committees having reported against it. Senator Ford's bill, substituted for his original one, very clearly defines the duties of the State Minerologist and makes considerable changes in the present methods of conducting the bureau. On Thursday Mr. J. J. Crawford, of El Dorado county, was appointed State Minerologist by the Governor, to fill the place of Wm. Ireland Jr., whose term expires March 1st.

Both the hydraulic mining bills introduced by Senator Ford have passed the Senate but are still in the hands of the Assembly committee. One of these defines hydraulic mining and provides that it may be carried on under certain conditions. The other provides for the appointment of a State Debris Commissioner to cooperate and consult with the U. S. commission. It also appropriates \$250,000 for debris dams, if the Government appropriates a like amount. If Congress makes no appropriation the bill does not become operative. Senator Ford has shown commendable zeal and energy in getting these measures through the Senate. Mr. Thomas, of Nevada county, is anxious to push them in the Assembly, but Chairman Hamilton of the Mining Committee of the Assembly calls no meetings and pays little or no attention to his committee. This young gentleman is from Placer county, where the "miners' movement" started, and his constituents are all interested in these measures. He was given this chairmanship out of compliment to that county. There are many important measures waiting the action of this committee, but the other members are unable to get their chairman to show any activity.

Obtaining Title to Drift Mines.

The executive committee of the California Miners' Association appointed as a special committee Messrs. Ross E. Browne, John Hays Hammond and Chas. G. Yale to call to the attention of Senators and Representatives from the mining States certain objectionable features in the pending Stewart bill, especially those which threaten injury to the gravel-mining interests of California. One section of the bill provides that not more than 40 acres of placer ground shall be included in the same application for patent, and this provision will doubtless necessitate a development and \$500 work of improvement on each 40-acre lot.

The term "placer" includes all of our gravel mines—the deep hydraulic and drift mines, as well as the shallow placers. The shallow placers are readily accessible and easily worked, and for these reasons might well be restricted as provided in the bill; but the shallow placers in this State were the first to be discovered, are being limited in extent, are almost exhausted. The deep gravel deposits, on the other hand, are difficult to explore. When suitably situated and not capped with volcanic material, these deposits are worked by the hydraulic process, requiring expensive preparation—miles of ditching, fluming, piping, tunneling, etc.—necessitating, as a rule, the inclusion of many times 40 acres of ground in one property. When not suitably located for hydraulic mining or when covered with volcanic material, these deposits are worked by the drifting process and constitute the so-called "drift mines," which are now yielding a large part of our annual product of gold. It is necessary to include many times 40 acres in one drift-mining property, as will be shown.

There are many extensive areas of undeveloped hydraulic and drift mining ground in this State, constituting prac-

tically all of the gravel-mining ground of the State to-day. Most of our drift mining ground is covered with barren volcanic material to a depth of several hundred feet and a width of a mile or more. Only the bottom gravel pays for drifting, and this forms a narrow winding channel course buried and hidden under the large accumulation of barren material. Its position cannot be estimated closely enough to cover it with certainty with a 40-acre tract. As a rule, it must be drained and worked through long tunnels, say from 1000 to 5000 feet in length, which must be driven through hard bed-rock before reaching the deposit. The cost of such tunnels is so great that there must be included in one property a considerable length of channel, say a mile or more, in order to warrant the expense of opening. A claim, therefore, to have any value must contain many times 40 acres—say 300 or 400 acres, or more. It would be unreasonable to require that each 40-acre tract should be opened separately—there is not one case in 50 where the gravel is rich enough to justify such a thing. It follows that if the provision in the Stewart bill passes, the average drift miner will be virtually debarred from securing patent-title to his property.

Suppose his property contains 320 acres (a moderate-sized drift mine), and includes one mile length of channel. He drives a long bedrock tunnel, costing say between \$10,000 and \$100,000, and taps the pay-channel. He may then apply for patent for one 40-acre lot, covering say one-quarter mile of the channel. The customary delays of the land office are such that he will probably have worked out this length of channel before patent issues. He may then apply for the next 40-acre lot, and so on. He cannot complete his title until his ground is worked out and is no longer valuable for mineral. Meanwhile, if he desires to sell his property, he can give no guarantee of title.

It is not presumed that Senator Stewart intended to limit an application for patent to an area less than absolutely required to constitute a single workable property, but his bill certainly does this. This provision will not benefit the small miner in this State; on the contrary, it will be just as serious a blow to his interest as to the interest of the large corporation. This is a matter of vital importance to our gold-mining industry, and an effort should be made to have this provision (limiting an application for patent to placer ground to 40 acres) either eliminated or else so changed as to permit the inclusion, in one application for patent, of the entire area necessary to constitute one workable property, even though such area be as great as four or five hundred acres.

The Cost of Producing Silver.

Senator Stewart of Nevada, in his zeal to promote the interests of free silver coinage, has brought forward an argument which will scarcely encourage investment in silver-mining properties. He has gathered testimony to show that the cost of production of silver is in excess of its full coinage value. Of course the idea is to prove that silver is not overvalued in our coinage system as compared with the expense of obtaining it. The subject is brought up by a report of the Senate Committee on Mines and Mining, which is signed by Senators Stewart, Jones, Power, Felton and Call. The argument in the report is said to be very elaborate, and much testimony is brought to hear. Prof. James D. Hague says the cost of production on the Comstock per ounce of fine silver ranged from a minimum of 35 to 40 cents on the production of the Big Bonanza in its most prosperous period, and disregarding all prior and subsequent assessments to a maximum of \$2.10 on the production of nondividend-paying mines. Taking all their assessments into account, the average cost of all the silver produced on the whole lode from the beginning has been \$1.10 per ounce. The average cost of the silver product of the United States for 1891 was 85 cents per ounce, not allowing for assessments or other forms of new capital invested in the business.

Following are fair samples of the mass of testimony: Ex-Senator H. A. W. Tabor, Colorado: "If we take into account the large plants of machinery left on exhausted mines, and the many millions of dollars' worth of work without results, silver costs, as a whole, \$1.50 an ounce."

Ex-Senator N. P. Hill, Colorado: "My opinion is that, adding to the cost the losses of all the unprofitable enterprises in silver mining the total average cost for the past 10 years in producing silver in the United States would amount to more than \$1.29 per ounce."

W. C. Wynkoop, editor of the *Mining Industry and Tradesman*, Denver: "In 1890 I secured the reports of about 160 incorporated mines which produced silver during the preceding year. Taking the companies which did not make a profit in connection with those which did, the cost was about \$1.15 per ounce." For the whole United States Mr. Wynkoop believes the silver produced has cost on an average of \$2 an ounce.

W. F. Reinert, editor of the *State Mining Journal*, Denver: "I think it quite safe and very conservative to estimate the average cost of producing an ounce of silver in Colorado at from \$1.50 to \$1.75."

Louis A. Garnett, San Francisco, estimates the cost of

the silver produced on the Comstock at \$1.50 per ounce. Simeon Wenban of San Francisco, states that he can furnish bullion from one of his mines in Nevada at a cost of 63 cents per ounce, but thinks that all the silver produced in Nevada has averaged not less than \$1.30. William H. Watson and L. A. Raymond, San Francisco: "We can safely say in our experience that every dollar of silver we obtained cost us at least \$2." William E. Sharon, James H. Kinkead, D. B. Lyman, A. J. McDonnell, E. Boyle and C. C. Thomas, the leading mining superintendents on the Comstock: "The cost of producing an ounce of silver on the Comstock to-day is \$1.37." R. K. Colcord, Governor of Nevada, puts the cost of all the silver produced in that State at over \$1.50 per ounce. Surveyor-General J. E. Jones, Nevada, estimates it at from \$1.50 to \$2.

The report states that 99 per cent of the supposed discoveries and locations of mining claims on which money and labor have been expended have produced nothing and are failures. All this appears to be charged up to the productive mines, as regards the value of their output. Why, is not quite clear, except that prospecting is necessary to find new mines. Perhaps if expert judgment were taken, so much money would not be spent on what turn out failures.

At all events, while Senator Stewart's argument may have some effect on free coinage, it will do no good to the silver-mining industry. People will not care to invest in an industry of which 99 per cent of the operations are proven failures; and if a man has a rich producing mine, the failure of a dozen or so near by is not apt to enhance the value of his product. We cannot tell the reason for the failure of many mines to pay dividends regularly, but in the case of the Comstock there are reasons apparent to people here, outside of the ore in the mines themselves. Mismanagement and dishonesty have been factors of the greatest importance. Millions have been stolen from the shareholders which were rightly theirs. Great fortunes have been founded by people managing these properties, while the properties themselves have paid no dividends.

Mr. Wenban, quoted above as getting his silver at 63 cents an ounce, is the greatest individual silver-producer in the United States. He has made a great fortune out of legitimate silver mining, without the speculative feature. He has looked after the mines himself, as men would any ordinary business. He confesses that other mining operations have not been profitable, but gives no reason. Of course, there are many failures in this business, but we do not believe they amount to 99 per cent of the whole as stated. The report of this committee will be held up for years as one to discourage mining investments, though many of the statements are untenable. Among other things, it includes gold mining as also unprofitable. California alone has produced \$1,270,000,000 in gold, and it is absurd to say it cost that. The rich placers here and there in Montana in the early days would strike an immense balance of profit alone for the gold-mining industry. There is never any discount on gold, as it is the basis of all values.

The Robinson Riffle.

At his cyanide process plant in Shasta county, Mr. A. B. Paul is using the Robinson riffle which he has briefly referred to in some of his articles in the PRESS. Inquiry has been made as to the construction of this riffle, and we have made a little sketch of it which is given herewith.



The Robinson riffle is made of any width—according to quantity of water and material to flow through. For ten stamps it should be about 12 inches wide. To make it take 1x12" boards and cut them off in two-foot lengths for making the bottom A. Then take some 2x4" and cut 12-inch pieces off. Nail the 1x12 two feet long to the 2x4 pieces at say B, all for desired length. Being thus put together, nail all the pieces together at C, and put eight-inch sides to the whole of 1x8" boards. Give it a grade of from 15 inches to 18 inches to 12 feet in length. The grade depends on the material to be washed. The operation of the riffles makes an agitation on wheels at the points D, as water and pulp flow over the points B. Mr. Paul says this is a very cheap, simple and efficient concentrator of gold and sulphurets. Any one using it will soon find grade, etc.

A LIEN of \$3000, held by O. Lonkey against the Keyes mine in Seven-mile canyon, has been foreclosed by order of the District Court. There are a number of labor liens also filed on the property, the control of which is held in San Francisco.

THE Queen of the Hills mine, at Neihart, has shut down because the miners refused to work for \$2.75 a day, which was all the company said it could afford to pay.

The Comstock Tunnel Company's Affairs.

The case of Frank T. Symmes and others against the Union Trust Company of New York and others is being tried at Carson, Nev., before Judge Thomas P. Hawley of the United States Circuit Court. The outcome of this suit will interest a great many people on this coast, especially those connected with Comstock mining. The facts of the case are, briefly, that McCalmont Brothers & Company of London loaned the Sutro Tunnel Company in 1877 about half a million dollars, the interest of which run up a debt against the company of about one and a half millions in ten years, which was secured by a mortgage on the property, the terms of which mortgage permitted the mortgagees to foreclose for non-payment of interest. Default in payment of interest having been made in 1881, the mortgagees proceeded to foreclose in 1886, and were to have foreclosed on the 1st of January, 1889. A number of shareholders of the company finally interested Theodore Sutro to save the property from foreclosure, and Sutro set to work to raise the money to pay off the mortgage. First he managed to get a large reduction of interest on the ground that the McCalmonts had got control of the Board of Trustees and got unconscionable bargains in their favor against the stockholders of the company in the way of large interest and compound interest, until the mortgagees agreed to take about \$800,000 for their mortgage on January 1, 1888. If the money was not raised by that time they would insist on their entire claim, and would become entitled to the entire claim by reason of the agreement to raise the money and pay off the mortgage. Theodore Sutro labored indefatigably, but failed to raise the money in time. He nevertheless, knowing the McCalmonts to be very old men and exceedingly anxious to settle up the matter, still worked on to raise the money, but one plan after another failed, until he finally interested the Union Trust Company of New York to advance the money, which the company did, and became the owners of the McCalmont mortgage. The company also became the trustees of a syndicate and assenting stockholders of the Sutro Tunnel Company, by paying to the McCalmonts \$800,000, which sum had been subscribed by assenting stockholders to a new plan of reorganization.

Advertisements were then inserted in the leading papers in the United States and Europe, calling upon the stockholders to come in under the plan of reorganization and protect their interests by subscribing, and detailing the fact that there was no reasonable prospect that the foreclosure and sale of the property could be averted unless all the shareholders came in as subscribers to the bonds. On the first of October, 1888, the Union Trust Company obtained a decree of foreclosure, and the reorganization committee of the Sutro Tunnel Company proceeded to again advertise in Europe and in the United States, and addressing circulars to all the shareholders, giving them a final opportunity to come in and subscribe to the bonds and save their property and stock.

On the 14th of January, 1889, the property of the Sutro Tunnel Company, except a few blocks of land in the town of Sutro, was sold to the Union Trust Company under the decree of foreclosure and order of sale, for the sum of \$1,325,000. The Sutro Tunnel Company allowed the time of redemption to expire, and allowed the sale of the property to be confirmed, without attempting to redeem the property. The sale left an actual judgment in favor of the Union Trust Company against the Sutro Tunnel Company of \$110,000. The deed was made to the Union Trust Company as the appointee and trustee of the reorganization committee, and as a trustee for the syndicate, and for the stockholders who had subscribed for bonds under the new plan of reorganization.

The Comstock Tunnel Company was organized subsequently for the purpose of carrying into effect the terms of the syndicate agreement, and the reorganization plan, and as a result a large number of the shareholders of the Sutro Tunnel Company are shareholders of the Comstock Tunnel Company. Subsequently the Union Trust Company deeded the Sutro Tunnel property to the Comstock Tunnel Company. This latter company is wholly free from debt outside of its bonded indebtedness of \$2,139,000.

The complainants ask the court to set aside the decree of foreclosure and sale and the confirmation of the sale under the decree on the ground of fraud, and ask that the Union Trust Company of New York be declared the trustee of the Sutro Tunnel Company.

Mr. H. L. Gear, of this city, opened the argument and claimed constructive fraud and collusion on the part of Theodore Sutro with certain of the trustees of the Sutro Tunnel Company in permitting the sale of the property. The opening statement of Mr. Gear was such that counsel for respondents gave notice to the court that they would ask permission to reply to the closing argument of Mr. Houghton on all new points which Mr. Gear had failed to give notice of in his argument. On Tuesday,

therefore, Mr. Houghton reopened the case and went through it exhaustively, and claimed not only constructive but actual fraud had been committed in permitting the sale of the property. For three days Mr. Edmund Tausky spoke in behalf of the respondents, reviewing a great mass of testimony from the very inception of the Sutro Tunnel Company. He claims that the complainants have entered into a conspiracy to maintain the suit in bad faith, and that the bill of complaint does not contain any matter entitling complainants to any equitable relief. The trial is still going on.

Coast Industrial Notes.

This, as a yield for a single year will, no doubt, be quite astonishing to people who have looked upon Alaska as of little value to the United States.

A MINE of antimony has been recently found and located in the San Jacinto valley, near Perris, the ore of which is said to contain 66 per cent. of antimony.

THE Board of Trustees of Modesto have made the award of a contract for the erecting of new city water works to W. T. Garratt & Co. of San Francisco for \$51,200.

PRESIDENT HARRISON has issued a proclamation creating the Sierra Forest Reserve in the State of California. The reservation comprises approximately 6000 square miles in the counties of Merced, Fresno, Tulare and Kern.

THE Modesto Board of Trustees has awarded to Williams, Bessler & Co., of San Francisco, the contract to construct a sewerage system for that city. There were 22 bidders. The bonds voted for municipal improvements amount to \$85,000.

THE steam schooner Excelsior was launched from Mathews' shipyard at Eureka on Saturday last. The vessel is the largest steam schooner ever launched on the coast. She was built for the Excelsior Redwood Company of Eureka. She will be commanded by Captain Higgins. Mathews will immediately lay the keel of another vessel.

EASTERN CAPITALISTS, who have been negotiating for the purchase of water rights and right of way for a canal to irrigate 200,000 acres in the northern part of San Joaquin county, have telegraphed that their agent had started for Lodi to close the contract. The water will be taken from the Mokelumne river, near Valley Spring, and will be run on both sides of the river.

At the annual meeting of the stockholders of the Carrara marble quarry of Amador county the following named were elected directors for the ensuing year: President, P. Barbieri; vice-president, J. A. Baxter; treasurer, the Bank of California; secretary, C. Dondero, and G. B. Oenasco, M. J. Fontana, G. Bovo, A. Paltoughi, J. P. Freana, Ph. Giovannini, P. M. Ricci, A. Chichichizola, trustees.

UNDER the new State law the Supervisors of Mendocino county have awarded twenty-four road contracts for four years at the rate of \$24,000 per year. A street-car franchise has also been granted Attorney J. M. Mannon, president of the Ukiah City Council, who will lay a track on the county road from Ukiah three miles southeast to the State asylum. Under the franchise, which is to run fifty years, he may utilize horse or electric power.

THE prospects are very good for Santa Rosa securing one of the biggest shoe factories on the coast soon. A company is being organized with a capital stock of \$100,000, \$40,000 of which is to be paid up. The stock has been nearly all subscribed for, and it is expected that contracts will soon be closed. A large tannery will be operated in connection with the shoe factory and employment will be given to about 150 persons.

THE White Horse Valley Mill and Lumber Company, an association of landowners having about 20,000 acres in Modoc and Siskiyou counties, have elected the following officers: president, Emanuel Meyer; vice-president, Dr. T. N. Iglehart; treasurer, A. W. Myer; directors—P. Koppen, William F. Schulz, F. H. Merzback and Louis Cooks. Eugene W. Levy and James Hermann were respectively appointed secretary and attorney of the corporation.

WORK has already been begun on the electric road which will connect with the Valencia and Mission street and continue out to the boundary line along the Mission road. The rails have been laid from Thirtieth street out to a point opposite the House of Correction, and men are at work drilling the screw-holes preparatory to laying the rails. It is expected the ground will be broken for the first tie in a few days, and once started the poles and wires will be run up inside of ninety days.

THE Fruitvale Railroad running from the depot at Fruitvale, Alameda county, to the Hermitage, will be changed to an electric railway early in March. It is the intention of E. C. Sessions, the owner of the line, to still use the double double-deck cars, which will make it the only railway in the country where double-deck cars are run by electricity. The poles and trolley wires have already been placed in position, and this work of changing the line will be finished as soon as possible.

FROM careful observations of the Spring Valley Water Works it appears that the amount of rainfall up to the 12th inst., when the late storm was concluded, is fully double that to the same date in 1892. At the Pilarcitos reservoir, 44.23 inches has fallen, against 29.93 for 1892. At San Andreas 35.18 inches fell this year, against 18.94 last. At Crystal Springs 32.74 has fallen, against 15.18 last year, and in San Francisco the figures are 22.78 and 12.88 respectively. The total amount of water collected in the different reservoirs during the last storm, which extended from January 25 until February 12, was 2,777,000,000 gallons, or enough to supply the city for 150 days. The total amount of water in the reservoirs on the 12th inst. aggregated the vast quantity of 21,500,000,000 gallons, or enough to supply the city with 20,000,000 gallons per day for over three years.

The Kootenai Country.

David P. Kane, who, with his brother, George T. Kane, owns the townsite of Kaslo City, B. C., and also some of the richest mines in the Kootenai district, was at the Portland the other day, says the *Portland Oregonian*. When questioned in regard to the already famous Kootenai mining district, Mr. Kane said:

"That Kaslo, Slocan or Kootenai district is situated on Kootenai lake, about 150 miles north of Spokane, and contains the richest and most extensive bodies of silver ore ever discovered on the continent. The ore, none of which averages less than 150 ounces to the ton, and contains from 60 to 80 per cent of lead, is all high grade and embraces almost every combination of silver ores known. Of these ores known as 'gray copper' and 'antimony of silver' are the richest. It is not uncommon for specimens to assay as high as 5000 to 6000 ounces, and I have in my possession a specimen that assays 10,000 ounces. Two years ago there were not 50 people in the entire district, and now there are more than 30,000. The richest ledges were discovered about a year ago, and it is since that time that the greater part of the people has come in. Kaslo City is the natural center of the district. Two years ago my brother and I preempted the townsite, paying \$2.50 an acre for the land, and we did not commence selling town lots until about a year ago. At that time heavy timber covered the spot where to-day stands a thriving town of 1500 inhabitants, with business houses and residences that would do credit to Portland. On the principal streets property sells at the rate of \$80 per front foot. All of the finest mines are within a radius of 10 miles of this little town, and even the most remote finds are within a radius of 20 miles. A wagon road 30 miles in length, and costing \$37,000, has just been completed from Kaslo into the very heart of the district. All of the ore is brought in on this road and dumped on the docks; from that point it is shipped on steamers down Kootenai lake and river to the Great Northern railroad, where it is loaded on cars and carried to the smelters, either at Tacoma, Helena or Great Falls. The cost of the wagon road was defrayed by subscriptions, and the entire amount was raised in Kaslo in two days.

"The first shipment of ore, which was made not long ago, consisted of 10 tons, or half a carload. The ore was taken from the Dardanelles mine, and Mr. McLain, the owner, in order to convince the people of the district that the ore had netted him that amount, secured payment for the ore in fresh, crisp bills and placed them on exhibition in a prominent place in Kaslo. In the entire district there are now about 1000 locations, of which 600 are now paying mines. There are about 250 men employed in the mines themselves and the daily pay roll is more than \$600. Over 600 horses are at present employed in hauling ore on the great road, and the ore is being dumped on the docks at the rate of 50 tons per day. Just now the greater part of it goes to Tacoma, but an 80-ton smelter is being built on the lake, about 10 miles below Kaslo, which will be completed next summer, and it is probable that others will be built before long, so that in the future the ore will be reduced at home. A sampling works will be built at Kaslo this spring, so the buyers can purchase ore on the spot. A peculiar feature of the district is the fact that the ores crop out on the surface and require very little development. The pure galena is found in solid bodies and does not require concentration, as in other well-known districts. One of the mines already has a tramway, and another has just put in a fine diamond drill. In other mines these things have only come after the mines have been in operation for years and thousands of dollars have been spent in development.

"A singularly interesting feature of the population is the fact that the district is altogether American. Wherever the English flag is seen the stars and stripes are close beside it, and the Fourth of July is celebrated as it would be in the most patriotic American city. With one exception the capital invested is all American."

Growth of the U. S. Patent System.

The last report of the United States Commissioner of Patents contains several graphic exhibits of the growth in numbers of patents issued to citizens of the United States in the century ending 1890, and a study of these diagrams leads to some interesting deductions. The first law controlling the issue of patents in the United States was passed by Congress in 1790; though at that time about 1,700 patents or caveats had already been granted under previous crude enactments by local or state authority.

The development of the inventive faculties of Americans, says *Engineering News*, seems to have been very slow in the earlier years of our national existence, if the issue of patents is to be taken as a basis of estimate. With the population increasing in a steady but rapid upward curve, the issue of patents, as recorded on the chart, shows a very slow growth until after the middle of the present century was passed. The passage of the new patent laws of 1836 and 1870 showed a depressing rather than an encouraging effect upon the efforts of inventors.

The year of 1852 is the first point of marked departure in this respect, and the rate of issue increased from 1,020 patents issued in that year to 4819 issues in 1860. The effect of the Civil War was at first to decrease the number of applications, but the urgent call for new devices of all kinds, brought out by the war itself, soon overcame this slight depression, as is shown by the fact that in the interval 1862-67, through which period the war may be said to have still influenced inventors, the issues rose in numbers from 3521 to 13,025.

After 1867 the rate of yearly growth was steady and rapid, with some falling off in 1871, 1872 and 1879. In the year 1891 there were 40,552 applications; 2408 caveats were filed and 23,244 patents were issued.

The next chart shows the number of patents issued to individual States in the period 1790-1890, and per 1000 of State population annually. Up to about 1850 this ratio per 1000 was low, and in this respect the several groups of States did not differ widely, the highest ratio being less

than one per 1000. But the rapid increase in manufactures and the founding of great industries in the Eastern, Middle and Western States after that date caused a very marked growth in the ratio of patents granted, as contrasted with the agricultural States of the South and West. The wits of inventors were sharpened by the demands of surrounding conditions in the industrial communities; and Connecticut, famed for the introduction of basswood hams and wooden nutmegs in our earlier annals, maintains her supremacy for inventive genius throughout the century, with the highest ratio given, that of 13.1 patents yearly for 1000 of population.

As to the South, the list of patents granted annually shows that conditions are now rapidly changing, and the marked development of Southern industries indicates a corresponding encouragement to inventors. Alabama, for example, took out 103 patents in 1890, as contrasted with 62 in 1880 and 36 in 1870. Georgia, Louisiana and South and North Carolina show a similar late increase in issues, while Mississippi, Florida and Arkansas remain at about the same low ratio for years. Taken as States, regardless of population, New York comes first, with 101,989 patents granted in the period 1790-1890; Pennsylvania comes next, with 51,140; then Massachusetts, with 48,992; Ohio, 34,606; Illinois, 33,642, and Connecticut with 21,810 patents.

But the benefits of the patent system are by no means confined to the manufacturing industries. As the Commissioner of Patents points out in his report, it was the invention of the schoolmaster Whitney, in his improvement of the cotton gin, that made possible the marvelous cotton culture of the South; and the settlement, cultivation and growth of the Great West are due to patented improvements in agriculture and in transportation. Under previously existing conditions it would have required the labor of about 24,000,000 men and boys to plant, till and harvest the American corn crop of 1889, a laboring force considerably outnumbering the entire population of the United States in 1850.

Use of Nitro-Glycerine Powder.

After the accident that occurred to Charley Lane, about a month ago, the *Eureka Sentinel* wrote to the California Powder Works for their views in regard to the explosion, and elicited the following reply:

"The probable cause of the explosion you refer to was that when the cans were used for thawing dynamite a portion of the nitro-glycerine leaked out of the cartridges and settled at the bottom of the can, there forming a coating. The cans being afterward placed on a forge fire, were of course subjected to considerable heat, resulting in a decomposition of the nitro-glycerine coating mentioned. The water in the cans, acting as a sort of tamping, prevented the escape of the gases, set free by this decomposition, and helped cause the explosion."

The following instructions will apply to all explosive powder made from nitro-glycerine mixtures:

Hercules powder will freeze at 42 degrees Fahrenheit. It must be thawed out before using when frozen, not by roasting it before a hot fire, nor in any vessel over hot iron plates, nor by leaning it up against hot brick-work, steam boilers or near the fire in the blacksmith forge; nor by putting it into the oven or in hot water to thaw. If you thaw it by putting it into hot water, a drop of nitro-glycerine may escape from the cartridge and settle to the bottom; the next time another drop, and so on. By and by you want the vessel to heat some water in; you put it over a hot fire and then wonder how a can of water can possibly explode. When frozen, the best way to thaw the powder is to place sufficient cartridges for the day on a shelf in the top of a warm room; the next is to put the cartridges in a tin or copper can, and set that inside of another vessel containing boiling hot water, place a cover over the whole, and the powder is soon thawed. It should not be heated hotter than 212 degrees Fahrenheit, for soon after that it throws off noxious fumes by decomposition. It should be stored in a dry, cool and well-ventilated warehouse. When so stored, it will remain in good condition in any climate indefinitely.

When set on fire in any ordinary way, it burns away by slow combustion, which produces different and more noxious gases than when explosion ensues.

To insure a perfect explosion, primers must be used so that the exploding cap may be properly adjusted.

Hercules powder will explode by being exposed to a gradual heat of 380 degrees Fahrenheit; by being set on fire where it is closely confined in some strong casket that would not let the gases escape, and by explosion in it or into it of any powerful fulminate like the regular exploding cap or charge of gunpowder, gun cotton, nitro-glycerine or other powerful explosive.

In loading a hole, when the fire from a safety fuse reaches the copper cap it explodes violently, and the explosion of the cap explodes the powder by heat and concussion combined.

It is not required that the hole be over two-thirds the diameter required for black powder.

The powder must be packed close in the bottom of the hole, using a wood rammer. Hard wood is the best. If the hole is tamped with water, it is best to use cartridges that are of the right size for the holes and pack them down tightly. If the primer is to be used in water tamping, care must be taken before inserting the cap end of the fuse into the powder, to make it water-tight at the juncture of the cap with the fuse, with white lead, grease, tar or otherwise. In all cases, if the fuse and cap are in good condition, by pressing the paper of the primer close around the fuse at the end where the cap is fitted and tying it with a string, an explosion is insured after firing. After loading the hole, fill in with an inch or two of tamping of sand or clay carefully, so as not to displace the cap and primer, then with your hard-wood rammer pack as solid as you please, ramming in with your hand, not with a sledge.

Be sure that your fuse and cap are both dry and in good order, always using the best qualities of each, so that

no chances will be taken on having to dig out a hole on account of a misfire.

By observing these instructions, any powder that is made with a nitro-glycerine mixture may be used with safety.

Numbering of Iron.

The present mode of selling pig iron is by the appearance of the fracture of pig metal when broken, and the producing districts have different classifications for their metal. Some of these districts have three or four grades only, while others have as many as eight or ten, and we have the card of a charcoal iron company that designates 14 grades. This multiplicity of grades and the variations of the grading in different sections of the country will always be confusing, and must soon lead to the sale and purchase of pig iron by analysis. For all practical purposes we can resolve the numerous classifications to about the following grades:

Anthracite and Coke.—Nos. 1, 2 and 3 Foundry; Grey Forge; Mottled and White.

Charcoal.—Nos. 1, 2, 3 and 5 Foundry; and Nos. 1, 2, 3, 4, 5, 6 and 7 Carwheel.

Besides these, we have in the South the soft and silvery irons, and in Ohio the silicized irons containing from four to ten per cent of silicon, both used to soften other irons and make them run fluid. In addition, we have the low phosphorus and sulphur irons used in the open hearth and Bessemer process for making steel and the low silicon and high phosphorus irons used in the basic process.

The carbon in pig iron is what enables the eye to distinguish the different grades, the softest, grayest iron having almost all the carbon in the graphite or uncombined state, while the hard and white irons have it nearly or wholly combined.

Anthracite and Coke Irons.—No. 1 Foundry is the darkest of the numbers as well as the softest, as it contains the most graphitic carbon. It is used exclusively in the foundry. In appearance the fracture is dark in color, rough, open grain; tensile strength and elastic limit low; turns soft and tough.

No. 2 Foundry is more generally used in the foundry than any other grade. The grain is not so open and large as No. 1 Foundry, but the iron is harder and stronger, although less tough and brittle. These two grades, especially No. 1 Foundry, become very liquid when melted, and will run into castings of the frailest and finest structure. The high numbers do not become so liquid when melted as Nos. 1 and 2. Graphitic carbon and silicon are both less in No. 2 than in No. 1.

No. 3 Foundry is used for both mill and foundry purposes. It is much stronger than Nos. 1 and 2, the grain being closer and more compact. It turns hard, is less tough and more brittle than No. 2. The strength for tension seems to reach its limit in this grade. It is less liquid than Nos. 1 and 2, and is therefore better adapted to heavy castings. The percentages of graphitic carbon and silicon are smaller and combined carbon larger than in No. 2.

Grey Forge iron is midway between No. 3 Foundry and Mottled, and is used principally in rolling mills. It turns hard and is weaker than No. 3, color light and verging into a white background; grain very close. Graphitic carbon and silicon in smaller proportion than in No. 3, and combined carbon in larger.

Mottled.—Except in the case of heavy castings requiring great strength and closeness of grain, where it is mixed with other irons, mottled iron is used exclusively for puddling purposes. Turns with great difficulty, less tough and more brittle than Grey Forge. Graphitic carbon and silicon lower than in Grey Forge and combined carbon higher.

White.—It is only when a furnace is working badly that this grade is produced. It has a smooth, white fracture, no grain and is used exclusively in a rolling mill; tensile strength and elastic limit very low; too hard to turn or drill, as the carbon in this grade is about all in the combined state.

No. 1 Soft, in grain is similar to 1 and 2 Foundry, lighter in color, quite soft and fluid with fair strength.

No. 2 Soft, runs between a 2 and 3 Foundry, except that it is light in color and is higher in both graphitic carbon and silicon. These irons, together with silvery irons, which are light in color and high in graphitic carbon and silicon, are used, as the name would indicate, for mixing with stronger and closer grained iron to make them soft and run fluid.

Charcoal Irons.—Foundry Irons made from charcoal are considerably stronger, and, because of the fuel, are much freer from impurities than irons made from coke and coal. The grain of charcoal irons of the same numbers as coke runs closer. They are used in foundries where great strength is required in castings.

Car Wheel Irons.—No. 1 is the softest grade, of which very little is used. It will not chill, and is used for ordinary castings.

No. 2 is produced in considerable quantities. It is closer to grain, is generally free from chill, is used for making malleable castings from furnaces and in remelting old wheels for a softener.

No. 3 is a harder iron and chills from one-quarter to three-quarters of an inch; is much used with softer irons in manufacturing car wheels.

No. 4 is still harder iron and will chill from three-quarters to one and one-quarter inches. This grade is used almost entirely for car wheel purposes.

No. 5 is about half white in the pig, and will chill from one and one-quarter to one and three-quarters inches.

Nos. 6 and 7 are white iron.

Nos. 5, 6 and 7 are mixed with softer irons in car wheel mixtures, and are also used in making chilled rolls.

There does not seem to be any standard governing furnaces, so far as the analysis of the different grades are concerned. This is accounted for by the variations of the constituents in iron ores as well as the character of the fuel used, which make it impossible to establish an analysis that would be accepted by all furnaces as a standard.—Chas. W. Sisson's A B C of Iron.

Mineral Wealth of Eastern Oregon.

TRACY, OREGON, Feb. 4, 1893.

TO THE EDITOR:—Thinking that our old California and Nevada friends are not aware of the mineral wealth that lies in eastern Oregon we will endeavor to give a brief but positive statement concerning it.

At the present writing we are situated on the Elk Horn mountain, in Baker county, about 15 miles from Baker City. On this mountain there are two dividend-paying mines known as the Baisly-Elkhorn mine and the Robbins-Elkhorn mine. The first-named has two of the Bryan mills on the ground and in active operation. They turn out from 150 to 200 tons per month of concentrates and from \$5,000 to \$7,000 per month of the yellow metal. The entire force of men required to work the mills and mine will not exceed 35, not including the wood-choppers.

The ledge runs northeast and southwest and has two permanent walls. There are three pay chutes that are developed in a distance of 300 feet along the ledge at a depth of 300 feet. These chutes start at the surface on the ridge and appear to be all in one and about 180 feet in length, but at the 100-foot level there seems to be a break in the ledge and the ore chutes split into three, varying from 100 to 40 feet in length. At the 200-foot level all the chutes are perfect and the walls smooth, and stand about 80 degrees. At the 300-foot level the ore chutes still hold their length, but increase in width, ranging from four to 16 feet. The ore is an iron sulphuret ore, but it contains no lead. This mine has been worked only a few years and has plenty of ore in sight already opened to run the mills for at least one year. It has been worked from the grass roots down on a paying basis and has made its owners wealthy, they being mostly poor men starting in.

The Robbins-Elkhorn is the south extension and has large bodies of ore. The walls are not so perfect owing to the fact that the development work is in a canyon and the works are not deep enough to avoid the breaks of the canyon. The ore is the same class as the Baisly, but apparently of a higher grade. This mine also has a mill about three miles down the canyon, but the deep snows in winter make it impossible to run during the winter months.

About a half-mile up the mountain lie the Hurdy Gurdy, Grand View, Denny and the Elkhorn Gold Mountain groups. These ledges parallel with the first-named ledges. The Hurdy Gurdy company put up a two stamp mill last fall and gave their claim a fair test, but owing to the lateness of the season they shut down for the winter. During the winter they have let a contract for a 400-foot tunnel that will tap the vein some 250 or 300 feet deep, and they propose to start up for permanent work at an early date in the spring.

THE GRAND VIEW.—The Grand View lies north of the Hurdy Gurdy. One of the ledges of this group has been sampled for a distance of 300 feet on the surface and gave an average of \$157 per ton. This company also will start a tunnel in the spring that will tap the vein 300 feet deep.

DENNY GROUP.—Mr. L. W. Nelson, one of the owners of the Denny group, also president of the Baisly-Elkhorn Mining Company, has already in operation a tunnel that will bring to view this group of mines. We are informed that the present owners paid \$10,000 for the Denny group. This group lies south and parallel with the other two mentioned groups.

The Elkhorn Gold Mining Company will continue their development work commenced last fall as early in the spring as possible. This company are sanguine of their prospect and expect to erect a Crawford mill early in the summer.

Mr. S. J. Fose, president and manager of the Grand View group, informs us that the Elkhorn mountain has not been thoroughly prospected yet, and that the coming season will only be the first step toward prospecting this mountain.

The advantages for wood and water cannot be excelled in any country. The Elk Horn mining district is among the richest districts in Oregon, and if we are not badly fooled, it will class with the rich districts of the Pacific coast ere another summer passes. We have not mentioned all the prospects in this district that will be worked during the coming summer. There are some rich prospects and some that can be classed as mines on the north slope of the mountain. The Robinson mine is a dividend mine and has new mills which are running steadily. This mine is only two and one-half miles from the Baisly Elkhorn mine, but is on the north slope of the mountain. We have only mentioned a part of the mines on the south slope. The ores in this district range from \$5 to \$500 per ton in gold.

There are three streams of water that join about a mile below the B. E. mill, one of which passes by the mill. The mountain is well supplied with timber and water. The only drawback to the camp is the lack of proper reduction works.

The Elkhorn mountain can be tapped by a tunnel a mile and one-half long that will tap all of the above mines mentioned on the south slope, a depth ranging from 2000 to 3000 feet deep. There is a good location for a tunnel site about a mile below the B. E. and R. E. mines that will tap these two mines, that are now paying dividends under the process which they are worked, something near 2000 feet deep. The site for reduction works and advantage of timber and water makes it a good investment to the company that takes the project in hand.

Those of you that are versed in the famous Sutro tunnel and the royalty that it has paid to the owners, would think strange for us to say that a tunnel in the Elkhorn mountain would be a better paying proposition than the Sutro tunnel, according to the capital invested. This project would not cost one-third what the Sutro did, and as we have sampled and prospected both Six Mile Canyon and Elkhorn mountain, we would willingly, and what we believe to be truthfully, say that there would be more in one-third of the ore that passes through this tunnel, than the entire amount that passes through the Sutro per year. There is no mining

capital in Oregon like the good old States of Nevada and California, but according to the amount of mining capital invested in Oregon, we will place her with any State as regards a paying proposition. True there has been lots of money spent in eastern Oregon in the way of mills and "wild-cat" mining schemes, but bring up all monies spent in mining projects, and Eastern Oregon will pay as many mills on the dollar, for capital invested, as any other State. And we can furnish as big mines in eastern Oregon as any State, according to development work. Lest some may think we are dwelling too much on one district, we will mention what you may look for in our next.

If all is favorable, in our next article we will endeavor to give a brief description of the White Swan and Vistin districts, located about 12 miles east of Baker City, while this camp is 15 miles west, and in fact we shall continue until all our districts are made known to the readers of the PRESS.

We have no religious, political, mining or social axe to grind in this or any other community, but we intend to communicate to the hungry miner and world the actual mineral wealth as we actually see it in eastern Oregon.

D. E. CUMMINS.

Some Points in Silver-Milling by Amalgamation.

TO THE EDITOR:—The present low and prospective lower price of silver makes a close study of the methods of its extraction more than ever necessary, and I offer a few points from my experience with some, though faint, hope that others may do likewise, which would surely inure to the benefit of the industry.

Silver-milling differs from gold-milling in that it is more of a chemical and less a merely mechanical operation, in so far as amalgamation is concerned. The gold which may be collected by means of quicksilver is already in the metallic state, and, while chemical considerations are not foreign to the subject, yet the main problem is the mechanical one of forcing the gold to intimate contact with the mercury, after freeing it from its rocky envelope. Silver, in ores, is almost invariably in some form of chemical combination from which it must be released by chemical action before it can be united with mercury as an amalgam.

Silver exists in ores in many different combinations, and these compounds are often chemically combined or intimately mixed with base metal compounds, which complicate the process of extracting the precious metal.

An example of the mixture of a silver compound with a base metal compound is seen in some argentiferous galenas, which, when triturated with moist sodium disulphate (sodium hydrogen sulphate), yield hydrogen sulphide, lead sulphate, and silver sulphide, the latter not being acted on by the reagent; in jalpaite, on the other hand, it is probable that the silver and copper exist as a double sulphide.

Among the native compounds of silver, the chloride, bromide and iodide are perhaps the only ones which can be metallized by simple contact with iron in the presence of water, and even with these the effect is promoted by an addition of salt and the application of heat. According to some authorities, silver glance (silver sulphide) yields the metal under the electrochemical action of iron and quicksilver in presence of hot brine, but it does so better if bluestone is also added to form cupric chloride by the aid of the salt. Other compounds generally necessitate the use of bluestone and salt, and even native metallic silver is much more readily recovered with than without such aid.

The copper chlorides, cuprous and cupric, and salt, are the only "chemicals" that are of general practical utility in the amalgamation of silver, and, in order that they may be effective, the ore, in the state of fine powder, must be exposed to their action, in hot solution for a certain length of time, depending on the character of the ore and the degree of comminution. Whether or not some of the silver ores, under these conditions, yield silver chloride, which dissolves in the brine, is a disputed point which need not be discussed here; what we know is, that the silver compounds yield the silver in a free state on contact with a relatively positive metal, as zinc, iron, lead, copper, or even quicksilver alone, the latter being at once the most expensive and the slowest, and it is only used in that way, intentionally, in the patio process.

In order that the bluestone may be effective, either the ore must contain no substance, except the silver compounds, which can decompose cupric sulphate or chloride, or such substance must be saturated. This may be done by using a sufficiency of bluestone, or, in some cases, by the cheaper sulphate of iron, or by sulphuric acid, sulphurous acid, sodium disulphate, etc. Thus, if earthy carbonate, lead carbonate or manganese oxides cause the trouble, either of the above substances will answer, some bluestone being also added unless the ore contains copper oxide or carbonate, in which case bluestone may not be required; but if the difficulty is caused by zinc-blende, galena or other sulphurets having the property of decomposing the copper chlorides, it is doubtful if you will not have to use an abundance of bluestone or give up its use entirely. Some ores contain so much of such substances that it will not pay to saturate them; and if they cannot be worked satisfactorily without, the best thing to do is to roast them with an admixture of pyritous ore and salt. There is, however, one case among these in which it may be feasible to treat the ore in the raw state—that is, when the only injurious substance present is calcium carbonate (or, probably, other earthy carbonates). Sterry Huot states that cuprous chloride is not decomposed by carbonate of lime, and, if this is correct, cuprous chloride might be readily made and used in place of bluestone, salt being added to dissolve it.

But it is not alone the composition of the ore that must be considered in this connection. The iron of the amalgamating-pan is constantly destroying the copper chlorides by precipitating the copper, which goes into the amalgam, and produces ferrous chloride which is of little use in the operation; hence it is desirable to retard this action as

much as possible, which end is promoted by crushing the ore as finely as may be needful in the battery and working the pan with the muller raised just enough to avoid grinding. If this be done, the entire iron surface soon acquires a coating of amalgam of silver, copper and perhaps lead, which diminishes the chemical activity of the iron. On the other hand, if the muller is allowed to grind the ore, the surfaces of the shoes and dies are kept free. Nor is this all. The pulp is pervaded by particles of iron ground off from the shoes and dies, and all soluble salts of copper are quickly decomposed.

In working roasted (chloridized) ore, it is not usually necessary to use any chemicals; yet, if the ore contains copper or lead, it is best to grind only so much as may be necessary to crush any lumps which may have been formed in the furnace; thus equally good results can be obtained as by grinding, and the bullion will be of a better quality. In regard to using an alkali in the pan when working roasted ore containing copper or lead, with a view to making finer bullion, by precipitating those base metals as oxides, it must be done with caution; if enough of alkali be used to completely precipitate the copper and lead as oxides, and to keep them in that state notwithstanding the constant tendency of ferrous chloride, produced by the decomposition of silver chloride, to cause their resolution, fine bullion will certainly be got, but there will be a larger loss of silver in the tailings.

Possibly carbonate of lime may not have this effect; I suggest its trial. My practice is to keep adding a little alkali, but never enough to quite prevent the staining of a knife-blade by the hot pulp.

The foregoing explains why it is that a roasted ore which forms a pulp with alkaline reaction, though yielding fine bullion despite the presence of lead or copper in the ore, yet does not give so satisfactory results as an "acid roast." This forms the exception to the rule that roasted ore requires no chemicals in the pan, for, if it can be done with economy, it will be advantageous to add sulphate of iron, or acid to such a pulp. However, it generally requires too much to counteract the alkalinity, and all that may be used will be wasted unless that result be attained.

One reason why an alkaline pulp makes richer tailings is that, in roasted ore, a part of the silver is usually combined otherwise than as chloride and, although iron reduces the chloride to metal, in the presence of alkali, it does not reduce some of the other compounds under such conditions. Some of these compounds seem to be double or multiple sulphates. Another probable reason is that, in an alkaline pulp, the iron surfaces remain free from any coating of quicksilver or amalgam, a state of things which is very disadvantageous for the collection of the silver.

C. H. AARON.

The Occurrence of Diamonds.

SAN FRANCISCO, Feb. 18, 1893.

TO THE EDITOR:—That diamonds exist in the auriferous gravels of California has long been known, and quite a large number has been found in various localities along the gold-belt.

The exhibition of rough diamonds in the exhibit of the State Mining Bureau at the Mechanics' Fair just closed in San Francisco attracted a great deal of attention, and was the cause of much comment and inquiry, particularly among mining men.

It is with a view to presenting some of their most common physical characteristics and the conditions under which they occur that this article is written. It may be that miners whose field of operation is in the placer mining region may by closer observation be led to the discovery of more of these rare and valuable stones.

In the first place, a very common idea that "California diamond" is synonymous with rock crystal, which is a transparent variety of quartz, must be laid aside. A California diamond is as much a gem as those found in South Africa, India or Brazil. They are similar in chemical composition, hardness, and every other feature, and a clear or first-water diamond, free from flaw and of a given weight, is just as valuable as a similar stone from the great Kimberly field in South Africa.

In the tailings of mills crushing cemented auriferous gravel in California the fragments of diamonds have been found, which is a positive indication that these precious stones may be found in the old river channels as well as in the more recent superficial gravel deposits.

The diamond is usually found in the form of an octahedron. That is a crystal having eight faces. These faces are triangular and are arranged in the form of two pyramids placed base to base. It is an exceedingly hard mineral, in fact the hardest of all known substances. In the scale of hardness of minerals it stands at the top—No. 10. Quartz is No. 7 and scratches glass. Topaz is No. 8, cutting quartz without difficulty. Sapphire, or corundum (emery), is No. 9.

The diamond is also a very heavy stone, having a specific gravity of 3.525 as compared with quartz at 2.65. In color it has a wide range, having been found in all the colors of the spectrum. Ordinarily, however, it is white, yellow, brown, or colorless, and more rarely rose-red, red, blue and green.

About 95 per cent of the diamonds now mined are from the Kimberly fields in South Africa.

The hardness is the best test. If corundum will not scratch it, and if a diamond will not scratch the specimen, the probability is, that it is a diamond.

In the United States, diamonds are found in two widely-separated localities, viz., along the eastern base of the Alleghany range, from Virginia to Georgia, and, in the West along the western base of the Sierra Nevada, through northern California to Oregon.

In both cases the diamonds are found in gravel with loose earth, and are associated with garnets and iron sands and less common minerals, and more particularly with gold.

The diamonds are undoubtedly derived from the crystal-

line rocks of the mountains. A rock which appears to occur in several diamond-producing regions is called itacolumite. This is a sandstone which splits off in slabs like flagstones, and contains scales of mica. The peculiarity of this rock is, that it will bend somewhat before breaking, and, if the pressure is removed, will resume its former shape, being therefore elastic.

The most common rock in American localities, and also in Brazil and India, is granite. All authorities do not agree that the flexible sandstone is the true matrix of the diamond.

In South Africa, where the greater number of diamonds are found, and those of greatest value, the formation is shale, containing a considerable amount of carbon; in fact, so much that when ignited the shale will burn.

Through this deposit of carbonaceous shale has burst a mass of eruptive rock, known to geologists as "peridotite." It seems that the diamonds have formed from the carbon of the shale by the intense heat, and, doubtless, vapors and gases accompanying the eruption of this volcanic rock. Peridotite is the name of a division of rocks consisting largely of olivine.

Observe the black lava found on the deserts of Nevada and California and in some of it you will see small bottle-green crystals more or less transparent. The chances are, that should you see such a mineral, it would be olivine. When it occurs in large amount, excluding the feldspars, it is called peridotite.

Now, it would seem useless to search for diamonds unless the carbonaceous matter were also present in the vicinity. The method of prospecting is by sifting the loose debris caused by the decay and disintegration of these rocks, and panning down like washing for gold.

To the casual observer the diamond may look like an ordinary quartz pebble, excepting its crystalline form—the octahedron, or a modification of it. The edges are usually rounded somewhat, and occasionally the diamond will be found twinned, that is, one crystal growing into or penetrating another. It has a peculiar submetallic luster—adamantine. Some diamonds look as though they had been rubbed over with stove polish.

The peridotite is usually dark green or bluish, and often almost black, with a rough, hackley fracture—tough, but soft enough to be easily scratched with a knife.

W. H. S.

The Hale & Norcross Decision.

The Supreme Court last week rejected the undertaking on appeal in the matter of the suit of W. M. Fox vs. the Hale & Norcross Silver Mining Company, Alvinza Hayward, the estate of W. S. Hobart, and others. It will be remembered that in this case Judge Hebbard gave judgment against defendants in an amount exceeding \$1,000,000. The undertaking on appeal was \$2,030,000. This was duly filed. The only surety was the Western Safety and Guarantee Company, with a capital stock of \$100,000. Fox excepted to the sufficiency of this undertaking and asked that the court proceed to enforce its judgment by the issuance of an execution, notwithstanding the undertaking filed on appeal by the defendants.

The defendants then applied to the Supreme Court for a writ of prohibition to restrain Judge Hebbard from issuing an execution pending the determination of the appeal. In its opinion the Supreme Court takes substantially the same ground taken by the plaintiff when he objected to the sufficiency of the undertaking. The Court says in effect that a corporation having a paid-up capital of only \$100,000 manifestly cannot pay a loss of \$2,000,000 any more than a natural person can. The application for a writ of prohibition was dismissed. It is understood that the defendants will at once ask the Supreme Court to grant them permission to file a new bond. The court says in part as follows:

"The single question submitted for decision was whether this corporation, with a paid-up capital of barely \$100,000, is sufficient as sole surety upon an undertaking to secure more than 20 times that sum. The proposition that it is in fact sufficient is on its face a palpable absurdity. A corporation which has only \$100,000 can no more pay a loss of \$2,000,000 than a natural person can.

"It is true that there is a personal liability on the part of the stockholders of a corporation for their proportion of its debts, and it is suggested that it was shown that some of the stockholders of this corporation were men of large means. But this fact does not help us to a construction of the law. Counsel for petitioners could not deny that the solvency and sufficiency of the stockholders of such corporations is a circumstance of which the law takes no account. If under the statute upon which they rely this undertaking is sufficient it would be equally so if its amount, instead of \$2,000,000, had been \$20,000,000, and if the stockholders, instead of being in some instances men of means, were every one of them notoriously insolvent."

The decision is written by Chief Justice Beatty and concurred in by Justices De Haven, Paterson, Harrison and Garoutte.

STEALERS OF PATENTS.—A business man in this city who is up to his ears in the work necessary to gather capital to float an enterprise, and at the same time to keep information of the nature of it away from busy rivals, found time last week to say: "Did you ever think that a patent does not patent in this country? Well, it's a fact. All that the Patent Office does is to give you a paper with some writing on it, but if another man steals your idea and goes to manufacturing your invention, the Patent Office will not lift a finger to protect you or to stand by its own decision. The fact that you've got a patent is a point in your favor, but you've got to hire lawyers and fight the thief in the courts, and if he can stand it to hire lawyers longer than you can that settles you, and you might as well make him a present of your invention. There are lots of men in the

country getting rich on the discoveries of other people. All they had to do was to take them, and fight the real discoverers into poverty. The Patent Office, to be respected and to be of any use, ought to have the power to cause the stealer of a patent to be sent to prison."—New York Sun.

The State's Work in Forestry.

In the various sentiments expressed in favor of the abolition of the commissions which were brought into existence about ten years ago, those favoring the lopping-off of the Forestry Commission have been most pointed and pronounced. In fact the commission suggested its own taking-off, and in the face of such a disposition to commit legal hari-kari, the Governor in his message could do nothing but yield a mournful assent, and proposed that the Fish Commission should fall heir to the remains. Thus the Forestry Commission came into the halls of the legislature with the death-damp on its brow—in most fit condition for burial, one would think. Though something has been done looking toward the obsequies, the funeral director has not yet been chosen and the corpse lies in state in Sacramento.

The forestry commission must unquestionably be pronounced a failure so far as any finished work in the advancement of forestry is concerned. It has been during recent years a most conspicuous example of appointive errors. The members of the board, though gentlemen of quality and eminence in legal and business lines, were apparently without the slightest convictions, knowledge or taste in forestry. Their appointees were in part like unto themselves and the man or two among them who did know trees and their uses was powerless to accomplish much because he found neither knowledge nor appreciation of the work among his patrons or associates. So far as we know the personnel of the State Board of Forestry was composed of men who could do anything and everything else in the line of public executive work better than they could conduct a forestry enterprise. In view of this fact it is perhaps natural that they should ask to be relieved. It is only too bad that they did not retire at the beginning and not fritter away a vast sum of money, waste years of valuable time and bring one of the most important lines of Government work into disrepute, making it to sink in the nostrils of the people so that the Governor could think of nothing else to do with it than to pass it along for the experts in stale fish to appropriately bury.

Now, though the forestry work of the State has fallen into such hard lines, we do not lack faith in State forestry. The work was well conceived. The first appointees on the board were, in part at least, men full of the importance of the work entrusted to them and full of knowledge as to the way in which it should be done. If such men had been kept in office, California would stand foremost among the States in measures for the conservation of forests and in the reforesting of waste or lumbered regions. There would also have been forestry stations, which would have yielded information to public and private tree-planters worth many times the cost of their maintenance. We admit it is disheartening, after seeing large amounts of public money frittered away, to think of maintaining such a State enterprise, and yet we are sure that, with the appointment of a proper board, vast benefits could be realized. The testimony of Mr. Abbot Kinney, a member of the first forestry board of California, recently given before a committee at Sacramento, is strictly true:

"The Board of Forestry did a good work in the past, and it can do so again. It's about the only State Board that ever secured over \$50,000 worth of property and turned it over to the State. This the Forestry Board did in securing the experiment stations at Chico, Hesperia, Santa Monica and other points. The early forestry boards helped the Government secure evidence against the big timber thieves and largely checked the wholesale depredations.

Just now, under the Paddock bill, there will be work for a State Forestry Board to carry out plans for preserving and protecting the various Sierra forest reservations. The Yosemite reserve is now protected simply by a policing system by soldiers. There should be arrangements for licensing the sheepmen to pasture their flocks at certain times in certain sections. The cattlemen are now favoring this idea and demanding that some adequate grazing system be adopted. Besides the great Yosemite forest reservation, there are now five other Government reservations for parks, including the Sequoia grant, San Bernardino and Trabuco. The San Bernardino embraces the forests on Mount San Bernardino and the water supply of Riverside and surrounding country. The Trabuco reserve is in the Santa Ana range, partly in Orange and partly in San Diego counties. The Government irrigation work, with the setting apart of reservoirs and the preservation of water-sheds, is also right in line with work which could be done by our Forestry Board if it could be kept entirely out of politics.

The fall of the Forestry Commission carries down with it all these measures and interests, so far as the State is concerned, unless this legislature make some provision for their continuance. The forestry stations will lapse into ruins. This property, given in good faith to the State by generous individuals, will fall ere long into the hands of some schemer, who may buy it, with other old junk, from the State Capital. This is certainly a painful and ignominious end for a great State undertaking. We think the legislature owes it to the people that some better solution of the question should be brought forward than has thus far appeared.

N. M. CHANCE in an article on the Anthracite coal industry, states that 55 per cent of the coal in beds is rendered unavailable, this great waste resulting from using the old method of working by parallel breasts, separated by regular pillars of coal. By adopting modifications in the long-wall system, or combined long-wall and relling systems, a much larger percentage of coal in the thicker seams could be recovered, but such systems would perhaps increase the cost per ton, and they require a large preliminary outlay in deadwork before mining on a large scale can be commenced.

Steel and Iron for Mine Timbering.

At a meeting of the Manchester Geological Society in the mining school, Wigan (reported in *Iron*), Mr. Isaiah Johnson, of the West Houghton Coal and Cannel Company, read a paper on "The Substitution of Steel or Iron for Timber in Mines." For more than 20 years, he said, it had fallen to his lot to have charge of underground workings, and during that time he had almost daily to supervise the setting and taking out of timber. While superintending those operations the thought had repeatedly occurred to his mind, could not something of a more durable character than timber be used, so as to do away with the necessity of having to retimber the main roads about every 12 months. After careful consideration, he resolved to try the use of iron props and steel girders, and his first attempt was in a main road ten feet wide. He secured his road for a distance of 300 yards with iron props and steel girders, and covered with $\frac{3}{4}$ -inch boilerplate, the girders being set about three feet apart. This was done six years ago, and he had not, as yet, had to take out or replace a single girder. They had now altogether 1400 yards of main roads secured with steel and iron, and about 1200 yards of that length was set in roads which would soon destroy the best-known timber for mining purposes, viz., larch, as even that class of timber would not last more than 12 months at the longest. During that time, even with the greatest possible care, there would very likely be breakdowns, and sometimes heavy falls, causing a stoppage of work and loss to both workmen and employers. In addition to that, in bad ground, there might be falls which would stop the work for two or three days, and this would, as they were all aware, cause considerable loss to all concerned.

The girders they were using for main roads were 10 feet long, 5 feet by 4 inches by $\frac{3}{4}$ inch, and the section of the props was 5 inches by 3 inches by $\frac{3}{4}$ inch. The cost of one girder, 10 feet long, and two steel props 6 feet long, and 30 square feet of $\frac{3}{4}$ -inch boilerplate, would be about 31s. per lineal or running yard. For securing the same area with timber, the cost would be from 10s. to 12s. per yard. Evidently the first cost of steel and iron would be nearly three times that of ordinary timber, but then the life of the former would be at least six times that of the latter, and would at the same time save the labor of refixing and the risk of falls, and consequent stoppages during working hours. He said at least six times the life of timber, because he had already proved it, and yet, so far as he could see and judge, it might last another six years, for, speaking generally, the road alluded to was as good as when first done; therefore, as time went on, the great cost of the first outlay was gradually and yearly being returned.

He, therefore, claimed for steel and iron the following advantages: That its life was at least six times that of timber; that there was, proportionately, less risk; there were no stoppages through falls; and that when a road was done with the materials could be again used, or even if they had to be sold they would at least take scrap price, whereas timber, when broken, would be worthless. Therefore, considering the cost of labor and the danger of taking out old timber and refixing new, which was very costly apart from risk, he was convinced that the use of steel and iron for securing main roads was preferable to timber.

In the discussion which followed, several members, including Mr. Burrows, Mr. MacGeever and Mr. Boole, generally expressed the opinion that, under certain conditions, iron and steel girders were very useful, but where the mine was easing down they were of the opinion that timber props were preferable; in fact it very much depended upon the conditions of the mine as to whether iron and steel girders were preferable to ordinary timber.

Mr. Henry Hall, Inspector of Mines, said he agreed very much with the conclusions arrived at by previous speakers; iron and steel girders were excellent where there was no moving weight in the roof, but where there was a moving weight they could get over the difficulty much better with timber. The best form in which he had seen these iron girders employed was upon masonry side-walls three feet thick. Where there was no great amount of moving weight they could get very satisfactory results; but so far as he had observed, the placing of iron or steel girders upon the top of timber props gave very unsatisfactory results. If they had a road which was specially difficult to manage, he thought they would have to fall back upon timber. The method of using these iron and steel girders might be considerably improved if it were made more constructive. In that neighborhood they dealt with the iron props and steel girders simply, but if they were more built together in some constructive form, it would be much better. On this question, he might remark, both with regard to wood and iron, that some of the difficulties arising might be avoided by constantly watching the ends of the baulks, so that requisite precautions might be taken whenever the crush came on. A good deal of timber might be saved if this point were more closely watched.

The chairman (Mr. W. Saint) said he had been watching the introduction of iron girders for some time past, and he had paid attention more particularly as to how they were affected under moving weights and side pressure, and the great difficulty there was in getting them out. These iron girders and props were far more dangerous to get out than ordinary timber, as they were liable to fly out when the weight was removed, and there was danger of catching the men.

THE CON. New York Mining Company has declared a dividend (No. 1) of ten cents per share, aggregating \$10,000, payable Feb. 15th. This is the first dividend declared by the company. There have been nine assessments levied, the last on Nov. 2, 1892, the total amount in assessments being \$130,000. After paying the dividend the company will have \$9100 left in the treasury.

Mechanical Progress.

Brush-Making Machines.

Brush-making is largely carried on by hand, mainly on account of the delicate manipulation required in some of the operations, and also perhaps because no mechanical genius has hitherto been found capable of coping fully with the difficulties involved. An innovation, however, has recently been made in this direction, by the introduction of two very ingenious machines into the brush manufacture by Messrs. G. B. Kent & Sons. These are a machine for ganging knots of bristles for brushes and brooms and a drill for making the holes in tooth-brush blanks, and which we recently saw in operation at Messrs. Kent's works at Victoria Park, London. Hitherto the process by bunching the bristles and drawing them into the holes has been performed by hand. The operator forms a loop in the wire, which is first passed through the hole in the brush-back, and then takes a bunch of bristles, which are placed in the loop, and, pulling the wire, draws the bunch into the hole, these operations being repeated until the brush-back is full. In this machine the bristles are contained in a hopper in which they rest horizontally at right angles on the top of a disc, which, by means of a treadle, is caused to partially rotate, first in one direction and then in the other. The disc has a notch formed in its periphery, and as the notch passes under the bristles some of them enter into the notch. Before the disc returns, a plate joined to the disc is moved, and closes the mouth of the notch, the disc then comes back and carries away the tuft of bristle retained in the notch to a position from which it can readily be taken by the fingers of the operative. The whole arrangement is that of a pecker or gripper, and the gripper can be regulated according to the quality of the material required to fill the hole. The operative passes the wire through the hole by means of a special needle fixed to a clamp, which she holds in her right hand, the loop being automatically formed. Into this loop she passes the tuft of bristles, pulls the wire, and thus draws the bristles into the hole, repeating the operation at each hole until they are all filled. The work is rapidly performed, and an expert can draw about 1800 knots or bunches per hour. The saving effected by the use of these machines is stated to be about 40 per cent., the output being about doubled. Although there is this gain to the manufacturer there is no loss to the operatives, who expressed their satisfaction with the machine.

The drilling machine to which we have referred is also an ingenious piece of mechanism. It is upon the multiple principle, the head of the brush being completely drilled at one thrust, the drills being carried in a fixed head and making 2500 revolutions per minute. The drills are arranged in the required form, and the tooth-brush blank is fixed in a traversing holder between a pair of centre jaws. The holder advances to the drills, and when the holes have been formed the holder retreats, the blank is taken out, and another blank put in its place for drilling. The rate of speed is about five backs per minute, or 300 per hour, which is a remarkable advance on manual labor. Both the machines are the patented inventions of Messrs Kent & Sons, and are manufactured at their works. The machines produce work similar in appearance and equal in quality to the best hand work.—Iron.

An Unusual Foundry Experience.

Having learned that in the foundry of the A. L. Sweet Iron Works, Medina, N. Y., an accident had occurred which seemed somewhat mysterious, we wrote the company for some information regarding it, our object being to give all possible publicity to the causes which may bring about injury to those employed in industrial works.

In reply, we have received from Mr. Albert L. Sweet, the proprietor of the works named, a very courteous letter, giving the desired information so far as possible, for which our readers, most of whom have more or less to do with foundries, will, of course, feel grateful to him. We shall hope some of our readers may be able to throw further light on the subject, and we invite brief communications with that object in view. The essential part of Mr. Sweet's letter is as follows:

We were melting a fifteen-ton heat in a newly-lined cupola, and soon after the blast went on a number of our men were affected by gas. Out of about fifty employed in the room, seventeen were so overcome that it required prompt medical aid to restore them. They seemed to become paralyzed to a certain extent, and unable to help themselves. Some of them seemed to suffer intense

agony, while others seemed more in a paralyzed condition. And from the statement of the doctors who handled the cases, it seemed to paralyze the lungs to such an extent that it was necessary to work rapidly in order to restore the action of the blood through the system. In about two hours or more, with the assistance of four physicians and what other help we could get, all were restored sufficiently to be taken to their homes, and the most severe cases were kept away from their work only four to five days.

As to what caused the gas to affect so many at this time is unaccountable. From actual experience of over twenty-five years in the business I have never seen nor heard of anything like it before, and in conversation with old molders, they claim they never had. The molding shop had been idle for two days. All ventilators were closed, and the gas after putting on the blast seemed to settle to the earth instead of going to the chimney. It was not our custom to open the ventilators until the room was warmed somewhat from the melted iron; doubtless the gas was all retained in the room.—American Machinist.

WATER IN A CYLINDER.—Referring to rolling-mill engines, there is one other difficulty that comes to mind, and that is, at the full load bringing water over into the cylinder. The *Boston Journal* says it remembers a mechanical engineer, after returning from a visit to a rolling mill in New England, calling attention to this matter. He noticed the engine pounding and asked the engineer in charge what caused it. "It takes so much steam," he answered, "when the load comes on, that it carries a lot of water over with the steam into the cylinder." He didn't believe it would do much damage. "Won't it?" remarked the listener, "I expect some day to hear that that engine has been blown through the partition." It could not have been two months after that the papers contained an account of the blowing out of the cylinder head of an engine at this mill and the resulting death of the engineer. It was the same engineer and the same engine. Water in a cylinder is bound to cause dangerous trouble sooner or later, yet there are many engines supplied with boilers too small where an unexpected addition to the load brings over water with the steam, yet the engineers are feeling safe enough under the supposition that there will not be water enough to cause any damage. An exceptionally high water line will some day cause the trouble.

CRUCIBLE STEEL FOR BOILERS.—The favor with which crucible steel is now being regarded in some quarters as material for boilers is, on the other hand, objected to on grounds that are believed by many good judges to be decisive. It is urged that though this process is for some purposes the best, that is, when steel is wanted in some small quantities of considerable purity, it is a failure when large masses of homogeneous character are required, as is the case in boiler plate, its shortcomings in this respect being due to the process of manufacture, which, as is well known, consists in melting wrought iron, etc., in a crucible holding generally from 80 to 125 pounds, and to obtain a mass large enough to make boiler plate, it is necessary to pour the contents of 20 to 50 crucibles into one mold to form an ingot. As the steel is made in each crucible, it follows that in 30 crucibles there are 30 different kinds and grades of steel in one sheet. The result of this process and of such combination, when subjected to the trying conditions found in a locomotive firebox, is declared to be disastrous in a majority of cases, homogeneity or absolute uniformity of the metal in this service being one of the most important elements found in long-lived fireboxes.

SOME brass condenser tubes in the United States cruiser "Baltimore," after being in service for a year or more, were found to have experienced a peculiar change. In many places the metal was changed to almost pure copper, of a spongy texture, the zinc having entirely disappeared. An investigation showed the probable cause of the failure to have been an electrolytic action between the tin lining of the tubes and the brass, the sea water circulating through the condenser forming the electrolyte. If the coating of the tin had remained perfect there would have been no corrosion; but the foreign bodies, such as mud and grit, carried in suspension through the condenser cut away the tin coating in spots, and it was at these spots that the electrolytic action occurred. A natural conclusion was that had the tubes not been tinned, they would have remained intact.

A TON of anthracite coal averages in bulk from 40 to 43 cubic feet. A ton of bituminous coal occupies from 43 to 48 cubic feet.

Scientific Progress.

Microscopical Research of Metals.

The investigations may be conducted on the actual fractures of the test-specimens, or on specially prepared test-slides. All those treated in the paper are of the latter kind, as using the plain fracture under the microscope does not give very satisfactory results. The author, however, adds a description of the method of employing the simple fractures. The foundation or cement, in which the specimens are placed for polishing, and the polishing material, must be prepared with great care, and varies according to the hardness of the specimen to be prepared. For rough polishing, the author uses fine emery. The fine polishing is done by hand on glass, cast-iron, copper, or lead plates prepared in a special manner.

The polishing powder may be of almost any good polishing material, but has to be extremely carefully prepared, as the grains must all be of one size. To prepare this, the author employs inverted conical glass vessels with a small aperture in the apex of the cone; and the polishing material, being mixed with water, and occasionally shaken up, passes through this aperture, and is divided into different sizes and numbers, according to the time taken to settle. The finest kinds are mixed with spirit or ether. To polish the specimens, which are about one-half inch square and a bare one-sixteenth inch thick, several of them are cemented side by side in a conveniently compact form, and an ordinary glass lens-polishing machine is used to polish them; or they may be polished by hand. The specimens are then taken out and thoroughly cleaned from any particles of cement that may be adhering to them by means of ether.

The coloring of the specimens can be done in various ways, and is one of the principal points to be attended to in microscopical research. The author recommends having several similar specimens under observation at the same time, with different degrees of coloring in each. The coloring brings out the various constituents of the material, and foreign substances contained in the interstices, e. g. ash, etc., and renders them distinct and visible from one another, which they would not be were it not for the coloring matter.

With pig-iron very strong contrasts can be made, but not so with wrought-iron. For photographic work the specimens must be more distinct and clearly marked than for mere microscopical work. The author maintains that the photographs are perfectly easy and simple to obtain, and proceeds to describe with several illustrations the apparatus used in the Berlin Royal Experimental Institute.

In order to obtain a uniformity in the exposure the author takes several trial or test proofs, systematically increasing the length of the exposure with each plate; he then selects the best proof and gives all the following photographs the same exposure as indicated by the test photograph. The developing is treated in a similar way, and by this means the author brings the process down to an almost entirely mechanical method.

Dr. Wedding was of the opinion that sooner or later the microscope would become as indispensable as the test-machine had become, and that all well-equipped laboratories and ironworks would in time possess the necessary apparatus for microscopical research.—Verhandlungen des Vereins für Eisenabnkunde, 1892, p. 67, thro' Proc. Inst. Civ. Eng.

Tannic Acid as a Mordant.

One of the great troubles in using tannic acid, or tannin matters in general, is that on keeping the tannic acid gradually passes into gallic acid, resulting, therefore, in a loss of mordanting power. This change is greatest at moderately high temperatures. As in either the operation of mordanting cotton or in tanning leather a large excess of tannic acid must be employed to effect good results, it follows that there must be a great loss in the operation, owing to the decomposition of the tannic acid into gallic acid. If this could be prevented, then a great saving would result, because the baths could be retained, and would only require new material to restore the original strength. Thus the life of the bath would be prolonged and the consumption of tannic acid reduced.

Some time ago a patent which had for its object the prevention of the loss of tannin, was taken out. The process consists essentially in keeping the baths at a temperature of 40° F., which is done by arranging a number of coils of pipe in the vat containing the

tannin liquors and passing through these coils brine from a refrigerating machine. At the temperature above mentioned the decomposition of the tannic acid is prevented, and so the life of the bath is prolonged.

The question arises, How will the low temperature affect the affinity of the tannin, for the cotton fibre, which appears to be greater at high than at low temperatures, although it is said to be of advantage in the mordanting of the cotton in mixed cotton and wool goods, the affinity of the tannin for the wool being reduced by the process?—The Dyer and Calico Printer.

A DISCOVERY has been made for the manufacture of a strong and flexible substance, as transparent as ordinary brittle glass. The process is as follows: From four to eight parts of collodion wool are dissolved in sufficient ether or alcohol; this solution is intimately mixed with from two to four per cent of castor oil or other non-resinous oil, and from four to ten per cent of resin or Canada balsam. This mixture is spread on a glass plate, and dried by a current of hot air, which, in a comparatively short space of time, transforms it into a transparent, hard, vitreous plate, the thickness of which can be regulated as required. The material thus obtained is said to resist the action of salts, alkalis and acids, and, besides being transparent, is odorless. Its inflammability is much inferior to that of other collodion combinations, and it can be further reduced by the addition of magnesium chloride, while an admixture of zinc-white produces an ivory appearance. It is flexible and almost unbreakable, and any shade or color may be imparted to it. An Austrian engineer named Eckstein claims to be the inventor of this process.

COMBUSTION OF HEAVY HYDROCARBONS. Lighting and heating by heavy hydrocarbons forms the subject of a communication to the *Genie Civil* by M. A. M. Villon, ingénieur-chimiste, who takes exception to the manner in which liquid fuel has hitherto been burnt. He observes that the conditions to be fulfilled for obtaining complete combustion with the heavy hydrocarbons are: (1) A division of the burners so as to obtain a number of jets of flame, between which the air may arrive in sufficient quantity to ensure the perfect combustion of the carbon and hydrogen contained in the fuel; and (2) a reception of the heat produced by the dividend or splitup combustion named above, on a large metal surface covered with water, in permanent contact with the flame, and at the points where combustion takes place; owing to this arrangement, the flames cannot attain a too high internal temperature so that dissociation is prevented, and indeed the temperature of propagation of the inflammation (ignition) need not be exceeded.

ONE of the recent industries added to the already numerous manufactures carried on in Chemnitz, Saxony, is the production of curtains made of India rubber as the main ingredient. The material employed for this purpose consists of 75 per cent of India rubber, five per cent of wool dust, five per cent of pulverized fruit stones, ten per cent of bleached amber varnish and five per cent of bleached leather waste, to these being added, if deemed necessary, a quantity of infusorial earth. The various substances thus named are together worked up with bisulphide of carbon in the most perfect manner into a thick mass, and from this are rolled out thin leaves, which are capable of being decorated with the greatest variety of ornamental patterns, and several of these leaves are combined to form a curtain.

COMPRESSING LIQUIDS.—Some experiments have been made by M. E. H. Amagat in the laws of the compressibility of liquids; deformations of the piezometers were investigated and allowed for, and the pressure carried as far as 3000 atmospheres. The liquids operated upon were ether, alcohol, carbon bisulphide, acetone, the ethyl halides and chlorides of phosphorus. The coefficient of compressibility was in every case found to decrease regularly as the pressure increased. At 3000 atmospheres that of water was reduced by almost one-half its ordinary value, that of ether by two-thirds. This diminution again is greater the higher the temperature. The ratio of the difference of the coefficient to the corresponding difference of temperature decreases as rapidly as the pressure increases.

WHILE paper is being used for dozens of purposes formerly monopolized by wood, or even a harder material, such as car wheels, boxes, barrels, tubs, pails, etc., wood is rapidly driving other ingredients to the wall in the manufacture of nearly all the cheaper grades of paper.

Electricity.

Gas Power for Electric Lighting.

In a paper read before the Institution of Civil Engineers, London, reported in the *Electrical Engineer*, Mr. Dowson stated that an aggregate of 7000 horsepower of gas engines were used in Great Britain for electric lighting, and up to an aggregate capacity of 1100 arc and 90,000 incandescent lamps in Germany. He stated that the varying load factor in central stations was a serious trouble, and he hoped to be able to show that much of the present loss due to fuel, water and wages would be avoided by the use of gas engines. Referring to the central station at Dessau, Germany, where a 120-horsepower gas engine was used, the consumption of gas was 39 cubic feet per kilowatt-hour. In spite of the loss of about 21 per cent in the accumulators used in this station large engines worked more profitably in parallel with them than smaller ones supplying direct without an accumulator. In the suburb of Munich a small plant, producing its own gas, showed a consumption of 3.3 pounds of coal per kilowatt-hour. In another similar small plant, having an output of 1155 kilowatt-hours per week, the consumption of fuel was 2.58 pounds and the cost of the gas, including wages and fuel, was one cent per kilowatt-hour delivered. In a small private installation in France for 650 incandescent lamps and one arc, the consumption was 1.2 pounds per indicated horsepower and 2.7 pounds per kilowatt-hour. It has long been known that with a dynamo run by a gas engine more light could be produced than by burning the gas directly in the burners. With the modern improvements in gas engines he says that the ratio now is 20 to 1 in favor of gas converted into arc lights by means of a gas engine. From compilations made from various sources using town gas, he says the average is 47 cubic feet per kilowatt-hour. When accumulators were used the consumption was less because the engines then worked under full load all the time. At 47 cubic feet and 55 watts per 16 c. p. one lamp required only 2.6 cubic feet per hour, whereas the standard argand burner required five cubic feet. The question of load factor was a serious one in any type of engine, but with gas engines the loss was much less than with steam engines. When a gas engine stops its consumption of fuel stops also, and there is no furnace to maintain, no water to boil at starting. It is, however, desirable that gas engines should be worked as much as possible under full load. In general, he says that it may be assumed that the consumption of coal was more than six pounds per kilowatt when accumulators are used and from nine to twelve pounds when accumulators are not used. In steam engines there is at best always a large consumption of fuel in banked fires and in starting which does no useful work. With gas engines one brake horsepower could be obtained with one pound of anthracite or $1\frac{1}{2}$ pounds of coke, while with steam engines, used in central stations, it must be taken at about 2½ pounds, showing a saving of about 50 per cent in favor of gas when fully loaded. For a maximum of 400 kilowatts three gas generators would be required; they have much less cooling surface than a boiler, contain no water and require no chimney draft. One of these generators loses only six to eight pounds per hour while standing idle. He stated that what is known as the Otto cycle would, in his opinion, have to be altered, especially when generator gas was used. In conclusion he says that in electrical stations supplied with city gas the consumption was about 50 per cent less than that required for the same amount of light from burners. Neither boiler nor firemen were required, no ashes are to be removed, less space was needed, no accumulators were required except to equalize the load and provide an amount for storage. They could be worked in crowded districts close to where the lights were required and where boilers were not allowed. Where generator gas was used the consumption of fuel under full load would be at least 50 per cent less than with steam power.

STORAGE AT CENTRAL STATIONS.—In a recent paper by Prof. Unwin, he calls attention to the fact that the lack of efficiency in central stations is due largely to the fluctuations of the load, and that it could therefore be increased by applying some means of storing. This applies even more directly to power stations for railways. He shows that storage batteries are too unsatisfactory and expensive and that gas-holders are cheapest when gas engines are used. He then explains the method of storing hot water under pressure for generating steam, and gives his

indorsement of the method as being practical and not requiring large plants. As he is a recognized authority, we call special attention of central-station managers to this, as it may play an important part in the future, especially as it is an apparatus which could be added to existing plants without radical changes. As it is not patentable, central-station managers need not fear that some years hence they will get into trouble due to some delayed and uncertain patent litigation.

The First Inventor of the Incandescent Lamp.

A sensation has been caused in electrical circles by the alleged discovery of an inventor of the incandescent lamp who antedates Edison by many years. As announced in our issue of Oct. 6, 1892, the Edison patent, No. 223,898, on the incandescent lamp was sustained in the court of last resort by a decision handed down Oct. 4th, and since that date injunction after injunction has been secured, closing the works of incandescent-lamp makers. But in the suit of the General Electric Co. against the Beacon Vacuum Pump Co. of Boston, the defendants gave the plaintiffs a great surprise by bringing forward affidavits from numerous witnesses alleging that one Henry Goebel, a German instrument maker, invented and made incandescent lamps similar in all essential details to the lamp described in the Edison patent, as long ago as 1855. Goebel emigrated from Germany to the United States in 1848, settled in New York City, and soon began experimenting with electrical apparatus. In the years before the war he operated a portable astronomical observatory, consisting of a telescope 15 or 20 feet in length, mounted on a wagon, which, on pleasant summer evenings, would be stationed in some open space in the up-town streets, uptown then signifying locations no farther north than Union Square or Astor Place. To attract the attention of passers-by, Goebel was accustomed to display two or three of his incandescent lamps, current for which was furnished from batteries placed underneath the driver's seat. It is thus seen that Goebel made no secret of his invention, and until his removal from his shop in Monroe street, which he occupied for more than a score of years, he continued to make lamps and publicly exhibit them. In 1881, soon after Edison's invention was made public, a company known as the American Electric Light Co. was organized to make incandescent lamps, and Goebel was employed to make carbons for the company, and produced excellent work until the company failed. Why the fact of Goebel's anticipation of the Edison patent was not then made public does not yet appear.

The history of Goebel's invention was given in great detail in 28 affidavits, which were filed by the Beacon Co., as its defense in the proceedings for an injunction brought by the General Electric Co. Besides the affidavit of the inventor himself, testimony was taken of several of his children and many of his neighbors, who were familiar with his work, also of Prof. Charles R. Cross of the Massachusetts Institute of Technology and of Mr. Franklin L. Pope. After hearing arguments from the counsel on both sides, the court granted a week's time for the filing of briefs and such further affidavits as each side may desire. It is certain that this remarkable case of prior invention will be thoroughly investigated, and the extent of Goebel's work will be determined.

The new lamp of the Westinghouse Co. also promises to lead to further litigation with the General Electric Co. The new lamp differs from the Edison or common lamp in being made in two parts, like a bottle and stopper. The joint between the two is made by a cement. The Westinghouse Co. probably relies on the fact that the stopper can be made of porcelain or some material other than glass to defend itself from the charge of infringement, as the Edison claim which has been sustained is for a carbon filament in a vacuum chamber made entirely of glass.—*Engineering News.*

AN ELECTRIC LIGHTING APPARATUS FOR MINERS' LAMPS.—An apparatus for lighting miners' lamps by means of electricity has just been patented by Mr. Prestwich, the managing director of the Protector Lamp and Lighting Company, Limited, of Eccles. It avoids any risk of fire in the lamp-room, and any possibility of igniting explosive gases in the mine. The arrangement inside the lamp consists of two small terminals being attached to the extinguishing-plate, in which is fixed a loop of platinum wire, which slightly overhangs the wick. A brass pin, insulated through the bottom, comes in contact with the battery, striking the insulated plate. The platinum wire becomes heated

to incandescence with the electric current, and ignites the wick. The current in the storage batteries is kept up by a full equipment of fittings, in the shape of a small engine and dynamo, a cabinet containing all necessary arrangements, such as armatures, cut-offs, regulators, and storage batteries for the lamp-room, while small accumulators, with safety tops, are charged up from the dynamo, and sent to different stations down the pit for relighting in case a man, by accident or otherwise, should lose his light. The advantages claimed for this arrangement—which can be adapted to any existing type of lamp—are that the lamps can be cleaned and locked up ready for use, and need not be lighted until required, thus saving oil; the lamps can be relighted in any districts in the pit with safety, thus saving time and expense, should a man, by accident or otherwise, lose his light; that the flame cannot be exposed after the lamp has been put together for the day; and that all lamps can be trimmed, etc., for the day, and there are no night shifts required, thus saving a great cost in the lamp-room.

Useful Information.

Heavy Rock Blasting.

In quarrying stone for the Westport harbor works, New Zealand, the charges used were carefully considered, says Mr. John Alexander Wilson, in a paper read before the Institution of Civil Engineers. The stone used was granite, gneiss and limestone, in large blocks. To obtain these cheaply, large blasts were employed, and the rock varied from bedded and jointed gneiss to homogeneous masses of granite. On an average, one pound of dynamite dislodged ten tons of stone, and the total amount of a charge was usually decided on this basis. The separate charges were proportioned in the ratio of the cubes of their least resistance, and this L. R. was divided by 35 for dynamite, 36 for gelignite, 43 for gelatine dynamite, 50 for blasting gelatine, and 12 for blasting powder.

Blasts containing three tons of explosives, and another of seven tons, were each failures, as they broke up the rock too much. It was found that charges of from $\frac{1}{4}$ ton to $1\frac{1}{2}$ tons were the most useful, and this class of blasting hardly answers with a line of least resistance exceeding 40 feet. Beyond that, the elasticity of the rock along this line becomes so great for the resistance of the backfill which the charge works, and instead of throwing the front out, the explosion may merely develop an undulating motion radiating from the charge.

The best results were obtained where the rock had one or more loose ends with a nearly vertical face; a strong toe at the quarry floor-level was usually first removed by hand-blasting before firing the large shot. The length of the adit was made as nearly half the height overhead as practicable, while the most even results were obtained if 15 multiplied by the least resistance was adopted for the interval between the chambers, and even less with irregularly-shaped blasts.

Electricity versus Gas.

Mr. Henry D. Fitch, of Louisville, Ky., presents the following figures showing the effect of electric lighting upon the gas output of a town of 8000 population which he with several others now controls. Mr. Fitch says:

I bought this property in 1889, and after reconstructing it in 1890, I became alarmed over the growth of electricity, and concluded to put in a good alternating electric light plant in connection with my gas works, and, at the same time, push gas for fuel purposes. We supply only private business; the city lights the streets with its own arc plant.

	Illumination. Cubic feet.	Fuel. Cubic feet.
In 1890 we sold gas for . . .	5,943,000	322,000
In 1891 " " . . .	5,545,000	776,000
In 1892 " " . . .	5,780,000	1,488,000

This is taken from consumers' ledger, and does not include leakage. No electricity was sold in 1890—only since March, 1891; and we make no effort to keep consumers from using it. It is probable that if operated by a competition, and with all night service, less illuminating gas would have been used, unless our price for gas was lowered. We get for illuminating gas \$1.90 to \$1.50, net, and for fuel gas, \$1 to 75 cents, net, using separate meters.

WHAT the ideal telescope of the future may do for astronomical science Alvan Clark bids us judge from a comparative survey of its past history and progress. When Galileo, in the early part of the seventeenth century, showed his first telescope,

which magnified only three diameters, to the astonished authorities at Venice, they little dreamed of the possibility of the Lick refractor of to-day. Galileo's first instrument was similar in construction to the ordinary opera-glass. It was no more powerful and was far less perfect. It consisted, in fact, merely of two single lenses, one being convex, and the other concave. Even his last and best telescope, magnifying thirty diameters, was much inferior to some of our spy-glasses.

The Telephone.

The telephone situation is becoming an interesting one. Coincident with the expiration of the various patents on the telephone, the enjoyment of which has been for so long exclusively in the hands of one company, there comes abundant evidence that many other concerns intend to engage in the telephone business as soon as they can safely do so. With the expiration of the patents on the Blake transmitter last month came an extraordinary call for these instruments from all quarters, and when the patents on the Bell receiving instrument terminate, not only will a great demand for receivers spring up, but the event will in all probability signalize the birth of competing telephone companies all over the land. There is every promise of lively times ahead for the telephone business. In the enthusiasm that will ensue there is no danger of going to extremes. The business will thus become demoralized as far as rates and profits are concerned; then an era of consolidation will dawn, and the result will be the formation of trusts and combinations. This is one way of looking at the matter, and as the tendency these times is to consolidate like interests and carry on the business under one management, there appears to be no reason why the telephone should be exempt from the operation of the rule. These are matters, however, that time alone will settle, and those who wish to engage in the telephone business in any capacity whatever need not be deterred from making an effort to succeed simply because of what may happen.—*Electrical Age.*

MOVEMENTS OF A MONUMENT.—According to the newspapers, some curious movements have been observed in the Washington monument. It is well known that all high stone monuments follow the sun, through the expansions which its rays produce on its illuminated side; but in the Washington monument it is found that besides the diurnal movement there is an annual one, the top of the monument describing, in the course of the year, a small circle. A strong wind is found to cause a slight inclination to leeward, showing that either the stone or the mortar in the joints is elastic within certain limits. These movements are detected by means of plumb-lines of wire, to which are suspended heavy lead weights. The weights are immersed in oil to diminish the effect of accidental vibrations, and the wires are enclosed in metal casings. It was recently rumored that the foundation of the monument had sunk, but the fact is that it has risen a few thousandths of an inch. This novel phenomenon is probably due to the expansion of the cement in the concrete, of which, as it will be remembered, the foundation is now practically composed, and it will be interesting to watch its progress.—*American Architect.*

A GOOD ILLUSTRATION of the increase of journal friction with decrease in temperature has been furnished by the gravity railways in the anthracite coal region. According to the press reports, the severe cold weather of the past week has greatly hindered the operation of these roads, some of which form important links in the transfer of coal from the mines to the steam railway lines. The friction of the journals was so much increased that cars had to be started with pinch bars on grades where ordinarily they move off as soon as the brakes are released.

STEAM users should bear in mind that a safety-valve on a boiler should be capable of discharging all the steam that the boiler can make with all other outlets shut. The U. S. regulations call for $\frac{1}{2}$ square inch valve area for each square foot of grate surface; but where the lift of the valve will give an effective area of $\frac{1}{2}$ that, due to the diameter of the valve, $\frac{1}{4}$ square inch valve area per square foot of grate will answer.

THE value of pig iron produced in this country is now greater than the value of gold, silver and copper combined. The value of the coal product is greater than of pig iron. The value of the silver product is less than one-sixth of the value of the other minerals named.

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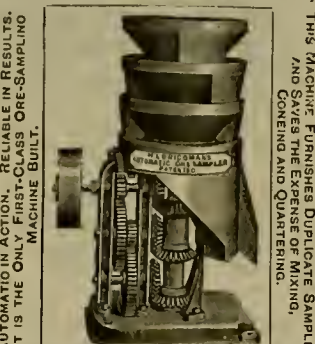
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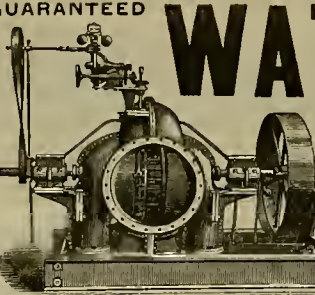
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Minerals from New South Wales.

J. E. Carne, F. G. S., of Sydney, New South Wales, arrived last week on the Monowai, en route for Chicago, where he will act as assistant to Hon. Arthur Renwick, member of the Legislative Council of New South Wales, in arranging the large mineral exhibit which this, the oldest of the Australian colonies, is making at the World's Fair. Mr. Carne is bringing with him large additions to the samples and exhibits already forwarded, and under Dr. Renwick's instructions will proceed at once to place them in position in the New South Wales' building at the World's Fair.

In conversation with a reporter Mr. Carne said:

"The space of 10,000 square feet allotted to our mining exhibit, although large, will not be nearly sufficient for our requirements, and I believe that arrangements will be made to increase the allowance. We have already sent over 300 tons weight of mineral exhibits, many of them extremely valuable, and there are still several more shipments to follow. Up to now 2300 packages of specimens, ore and mineral samples have been forwarded. Naturally our principal feature will be gold, a metal which we have been producing uninterruptedly for half a century. We shall send this in every imaginable form, from rough wash dirt to highly finished ingots. The precious metal will be shown in every possible manner. There are lumps of quartz showing the reef gold imbedded, and from this it will be seen in every stage of treatment; also alluvial gold in its various shapes.

"Next in importance will come silver. We are exhibiting samples from the big mines at Broken Hill, the most wonderful field in the world—New England mines, Sunny Corner and various other hitherto places of the white metal in New South Wales.

"In addition to showing gold and silver in all its stages, we are designing pyramids, obelisks and other trophies, and we are sparing no pains to make this branch of the mineral exhibit one of the most attractive features of the exposition. A huge lump of silver ore has been forwarded in its native state with the shining metal sticking out of the body, and this will be set upon a pedestal.

"In speaking of the silver from Broken Hill, I cannot refrain from making a few remarks upon this celebrated silver field which has lately been the scene of so much trouble between those two great factors, capital and labor. The original mine, the Broken Hill Proprietary, turned out between May, 1886, and May, 1892, when the labor dispute arose, no less than 36,500,000 ounces of silver and 150,000 tons of lead. It has paid in dividends to the shareholders £278 on each £20 share, which were issued at £9, and on which no calls have ever been made. This means interest at the rate of 3100 per cent on the original cost of the shares, which I consider a tolerably good investment, even for Australia.

"In addition to the precious metals, we are sending several samples of coal from our mines at Newcastle, Bulli, etc., and prominent among the attractions will be some full sections showing the whole width of the seams."

Painting of Structural Iron.

At the last meeting of the Engineers' Club of Philadelphia, Mr. Edward Hurst Brown read a paper on this subject, in which he described the composition of paints for use on wood and metal surfaces, with particular attention to the proper material to use on structural iron work. He said that it is very essential that the iron itself should be absolutely free from rust, as the latter will spread from a point under the paint if there be the slightest chance for it to do so, flaking off the paint and thus gradually exposing the bare surface of the iron to the destructive action of oxygen in the presence of water.

The iron should be prepared by removing the scale with a stiff wire brush and destroying the rust by a pickle of dilute acid, which must be afterward washed off before applying the paint. For use on iron exposed to changes of temperature, to gases or moisture, a paint was recommended called "anti-rust," which is manufactured especially for this purpose. Sections of iron pipe were shown which had been painted with this material and with other kinds of paint, and exposed to various severe conditions of temperature and oxidizing gases.

The writer considered it very important that specifications for painting engineering constructions should be carefully drawn and strictly adhered to, even to the specification of definite brands or makes of materials. The engineer should experiment, in order to determine the best paint to use under given conditions, or should seek advice on the subject from those who have made its manu-

facture and its wearing qualities the study of their lives. It is poor economy to use any but the best material obtainable, the saving in the first cost being more than counterbalanced by the labor of renewing the paint in a comparatively short time.

THE FRANKS OF LIGHTNING.—The pranks of lightning in connection with street railway apparatus are particularly vexatious, says *Engineering Magazine*. One peculiarity is that the "fluid" always seeks to strike at the very heart of the system, the station generator, and if it succeeds in disabling this the entire system is brought to a standstill. In some parts of the country, when a violent thunderstorm makes its appearance, it is a common practice to shut down the dynamo, remove the trolleys from the wires and await with as much patience as may be the subsidence of the disturbance. It is stated that on one line, where an account has been kept, the loss of revenue due to compulsory stoppages during thunderstorms amounts to over \$6000 per year. An ingenious form of lightning arrester recently devised to overcome this difficulty consists of a coil of wire inserted in the main circuit and fitted with a number of discharging circuits connected at different points throughout the coil, leading to electrodes immersed in a tank of running water in electrical connection with the earth.

The financial value of technical training in the United States is illustrated, says the *New York Sun*, by the fact that engineer officers of the navy often resign their commissions to accept profitable employment with large manufacturing concerns. A man armed with the training and technical education of a naval engineer can command in civil life a salary from two to five times as great as his pay in the navy. Engineers must serve for the greater part of their lives at less than \$500 per year, and the number to pass \$6000 must be exceedingly small. The plums that await such men in civil life are of a sort to prove a serious temptation to all who feel the necessity of a large income, and it is only the ease and dignity of a naval life that keep skilled engineers in the service.

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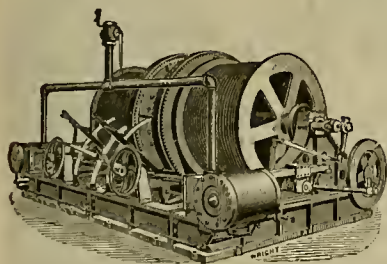
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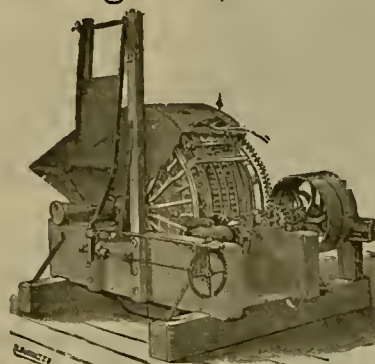
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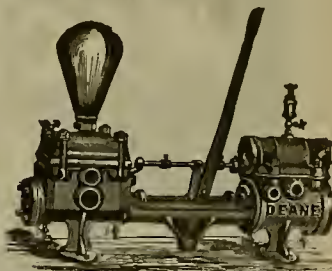
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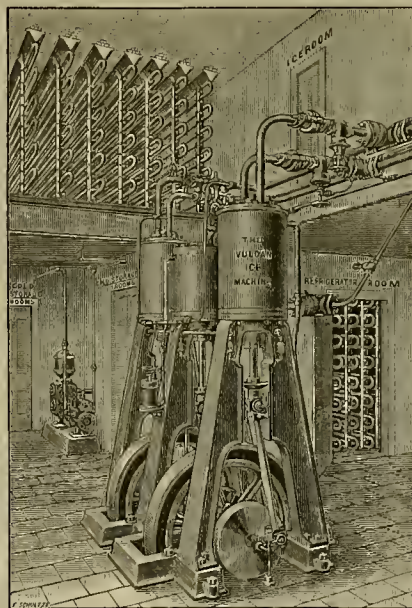
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continue to extract some ore from the old stopes, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. The winzes started in this west crosscut, in old timbers, has been sunk 14 feet, and some fair-grade ore has been extracted therefrom. Have extracted during the week from the 1500 level stopes and 1650 southwest drift openings and raised to the surface 546 cars of ore about 540 tons. Shipped to Morgan mill 803 1990-2000 tons of ore. Average assay value, per railroad car samples, \$26.37. The average assay value, per battery samples, of all ore worked at the mill during the week (705 tons) was \$23.41 per ton.

OPHIA.—1465 level.—Have continued the work of cutting out a chamber in the north lateral drift on the sill floor of this level, at the point where connection was made with this drift by the upraise which was carried up from a point 99 feet below on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 20 feet; total length, 553 feet, continuing in porphyry and some clay.

UTAH.—340 level.—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 22 feet; total length, 104 feet; continuing in porphyry, clay and fine lines of quartz.

SIERRA NEVADA.—West crosscut No. 2 from Kenosha tunnel, started from north drift, 800 feet in, has been advanced 29 feet during the past week; total length, 700 feet; face is in porphyry with stringers of quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 23 feet during the past week, making the total distance west of the shaft 2934 feet; face is in clay and porphyry.

UNION SHAFT.—The joint Union Con. and Sierra Nevada west drift, 900 level, has been advanced during the past week 23 feet, making the total distance west of shaft 2934 feet; face is in clay and porphyry.

ANDAS.—On 420 level have been timbering north drift from east crosscut No. 1, north. Work resumed in face of drift.

GOULD & CURRY.—200 level: During the past week, west crosscut No. 5 started in northwest drift, 432 feet from main west drift, has been advanced 19 feet, passing through porphyry, seams of clay and stringers of quartz; total length, 309 feet. On the Suro tunnel level the joint east crosscut with Best & Belcher Company from the joint north drift has been extended 20 feet; face of same in porphyry.

BEST & BALCHER.—200 level.—During the past week the west crosscut No. 1, started in northwest drift, 170 feet from our south line, has been advanced 20 feet, passing through quartz giving low assays; total length 57 feet. 900 level.—All work on this level during the past week has been on repairs. Suro tunnel level.—On this level we have taken charge, jointly with the Gould & Curry Company, of the north drift which was run by that company and the Savage to the Gould & Curry south line. At present we are running an east crosscut to make connections with the Gould & Curry winze carried down from the 1600 level. When the connection is made it will secure good ventilation and enable us to prospect the Gould & Curry and Best & Belcher ground going north.

HALE & NOACROSS.—We continue retimbering main shaft above the 400 level. Main Incline.—Are making the necessary repairs. 1400 level.—We continue retimbering the main north drift on this level. 1800 level.—West crosscut No. 1 from the main south drift was advanced 17 feet; total length, 130 feet; face in porphyry. West crosscut No. 3 from main north drift was extended 20 feet; total length 335 feet; face in porphyry with small seams of quartz. West crosscut No. 4 from main north drift was advanced 19 feet; total length 176 feet; face in porphyry and streaks of quartz.

CHOLLAS.—The north drift from the south line, 550 level, is out 168 feet; face in low-grade quartz. Are repairing north drift, 750 level and retimbering the two north compartments of the main shaft above 930 level. Have resumed work in the east crosscut, 160 feet south of north line, 930 level, which is now out 254 feet; face in porphyry.

POTOSI.—South drift, 30 feet back from the face of east crosscut from the Potosi winze, 930 level, is out 39 feet; face is in porphyry and stringers of quartz. South drift from top of raise, 1000 level, is out 152 feet; face is in porphyry and stringers of quartz. The north drift from top of raise, 1000 level, is out 98 feet. Have passed through some good ore during the week; face is in stringers of quartz and porphyry. The north lateral drift from the bottom of the Potosi winze, 1800 level Ward shaft, is out 30 feet; face in quartz and porphyry. Extracted and sent to the mill the past week 490 tons and 1750 pounds of ore from the 550, 950 and 1150 levels. Milled during the week 527 tons; on hand at mill, 100 tons and 1000 pounds. Average battery assays, \$22.53. Average car sample assays, \$23.64. Shipped to U. S. Mint, Carson, 239 pounds of crude bullion.

BULLION.—The west crosscut from the north-west drift, 300 feet south of north line, 1800 level of Ward shaft, is out 288 feet; face is in quartz and porphyry.

APAX.—Did not sink No. 1 winze this week, as the prospects for a bonanza are better as we proceed northward. Will send the drift farther north before sinking.

WAAN SHAFT.—The connection from the pressure pipe, 1800 level, to the blowers is completed. The west crosscut from the north-west drift, 300 feet south of the Bullion north

line, 1800 level, is out 288 feet; face is in clay and porphyry. The north lateral drift from the bottom of the Potosi winze, is out 30 feet; face is in quartz and porphyry.

ALPHA.—The connection from the pressure pipe, 1800 level of the Ward shaft, with the blowers, is completed.

EXCHAUQUER.—The connection from the pressure pipe, 1800 level, Ward shaft, with the blowers, is completed.

OCCIDENTAL.—The east crosscut, No. 5, from the end of north drift, 750 level, is in 30 feet, and has reached the clay wall. Some bunches of good ore were found in the crosscut near the clay wall. Have resumed driving the main north drift. The crosscut from the bottom of No. 2 winze, in south drift, is in 10 feet in ore of fair quality. The Zsidig drift, Suro tunnel level, has been extended 12 feet in hard porphyry; total length, 825 feet.

NEW YORK.—The winze on the 650 level is down on the stopes 91 feet; bottom is in quartz, some of which gives fair assays. The west crosscut, from the southwest drift from the shaft, 850 level, is out 54 feet; formation, soft porphyry.

SILVER HILL.—The southeast drift, 450 level, has been advanced during the past week 5 feet, through hard porphyry; total distance from north line, 52 feet.

KENTUCKY.—From the stopes on the 160 level we continue to extract from two to three tons of ore per day of an average value of \$37 per ton. The south drift from the Jacket east crosscut on the 1100 level was extended 24 feet; total length, 100 feet. The face is in ore assaying from \$5 to \$20 in gold.

Tuscarora District.

NAVAJO.—*Times-Review*, Feb. 17: Work for the week has been confined to the stopes above the 350-foot level, which are without material change.

BALLA ISLA.—The stopes above the 250-foot level are looking about the same. Line crosscut, same level, extended 10 feet, cutting a vein which shows a little good ore.

NORTH BELLE ISLE.—The stopes above the north 300-foot level still yield high-grade ore, but the vein is small. The stopes above the south 300 are yielding a little good ore.

ARIZONA.

THE COMMERCIAL COMPANY.—*Arizona Silver Belt*, Feb. 14: Prof. Jas. Douglas and Miss Douglas took their departure on Tuesday. During his short stay here, the Professor inspected the principal claims belonging to the Commercial Mining Co., and outlined the course to be pursued in relation to the company's interests in Globe for the immediate future. We regret to learn that the Commercial Company has decided not to prosecute active work on their claims in Globe District, at least until the construction of a railroad to Globe is well under way and its completion assured. Prof. Douglas, we understand, does not take a hopeful view of the copper market, which probably influenced his decision. Dr. Alexander Trippe resigned as superintendent some time ago, and will be succeeded by E. H. Cook, who will act as agent of the company here and will have direction of the work on the Buffalo group and Buckeye mine. Mr. Philip Oates will continue in charge of all the other claims belonging to the company. Prof. Douglas received a telegram on Monday announcing the destruction by fire, Feb. 5th, of the Commercial Mining Co.'s reduction works at Copper Basin, Yavapai county, consisting of smelter, chlorination and leaching works. The works were closed owing to a scarcity of water, only a watchman being in charge, and the origin of the fire cannot be accounted for, unless it was incendiary. It was a very complete plant, valued at \$125,000 or more, and on which there was no insurance.

OLD DOMINION.—Y. Aguirre, who does the largest freighting business on the Wilcox and Globe road, came in yesterday in advance of his six large teams loaded with coke for the Old Dominion Copper Co. He reports the road in fine condition, but feed very scarce. Shipments of Old Dominion copper have commenced from Wilcox. Only two shipments were made from that point during the last half of 1892, and two or three million pounds had accumulated.

MOHAVE NOTES.—*Miner*, Feb. 18: Brawn's teams brought in eight tons of concentrates from the C. O. D. mine one day this week. Mix & Jackson have discovered some fine-looking ledges in Minnesota district, a few miles west of the Jennie mine. Newton Snell is still prosecuting work on the Antelope mine. Wallapai mountains, and is taking out ore of exceeding richness. Jas. Penberthy is again at work on that old standby, the American Flag, among the murmuring pines of the lofty Wallapais. Messrs. Maloney, McGregor and John Campbell are taking out some very rich rock from their lease on the Horn Silver, Eugene camp. Our old friend Thomas Steen has encountered a large body of rich ore in the new workings of the Jennie mine, Minnesota district. R. G. Patterson had one ton of ore from the Prince Albert mine worked at the sampler this week. It netted the owner over \$1000. Shepherd & Smith have four men at work on their Horn Silver mine, Eugene camp, and the property is developing into one of the finest mines in Minnesota district. Quite a number of prospectors are scouring the hills in the vicinity of Eugene camp in the search for the precious metals, and quite a number of good-looking ledges have been discovered. Messrs. Williams, Hamblin and Chidister are taking out rich gold ore from the Lucky Boy mine, Minnesota district, and have enough ore in sight to insure them at least a World's Fair stake. Frank Hamilton, Richard Cleve and H. P. Cox have out several tons of good ore on the dumps of the Mississippi mine, Wallapai mountains. They expect to make a load

shipment next month. Messrs. Frank Allen and Tom Shannessy have leased a portion of the Greenhorn mine, near Eugene camp, from McGregor & Shepherd, and have commenced work with a good body of ore in sight. P. R. Washington is leaching at Jennie Springs, Minnesota district, on ore from the Horn Silver and Silver Flake mines, and seems to be doing a good deal of good for himself in the way of a World's Fair stake. Henry McLaughlin was in town from the Minnesota mine Thursday. He informs us that John Barry's little mill at that place is turning out concentrates at a lively rate and will shortly ship a quantity to the sampler. Conkey & Tyler had two tons of ore from their lease on the Prince Albert mine, Indian Secret district, run through the sampler yesterday. We were unable to learn the exact figures, but suffice to say it reached into the thousands. Dowd & Detricks have taken a lease on the Crownlet mine, Indian Secret district, and they have encountered a beautiful body of 400-ounce ore on the 100-foot level they are running east from the bottom of the shaft. This property is owned by Messrs. Conkey, Tyler and Galigher, and bids fair to become one of the mines of that district.

IDAHO.

GERMANIA BASIN.—*Ketchum Keystone*, Feb. 18: W. S. Feagley arrived in Ketchum last Saturday direct from Germania basin. He reports the lessees in that camp all doing well. The lessees of the Parnell mine, owned by Daniel Hawkesworth, have taken out 60 tons of high-grade ore, and have enough more in sight to keep them employed for months. Ole Opland, lessee of Fred Phillips' Idaho mine, has taken out about 20 tons and is working in a body of ore that seems almost inexhaustible, and of high grade. Charles Challis & Co. have been working on a flume since '85 to carry water to work their placer in Kelley gulch, located in Stanley basin. The flume is large, being 2500 feet long and 32 inches wide. They made a clean-up last summer which was satisfactory, and a run this summer will bring them out all right.

MONTANA.

GOLD MINES.—The prominent gold mines near Philipsburg are the Alps, on Harvey creek, and the Royal Gold at Medhurst. Both of these properties are now undergoing vigilant explorations for the purpose of determining what class of reduction works will be necessary to handle the ore successfully. Both have immense ore deposits in sight, and both have small mills that pay very well.

THE SUNAISE MINING CO., a Philipsburg corporation, owns 14 claims south of Henderson gulch—an early-day placer camp—about 12 miles from this city. It is claimed that the Sunrise people own the ground and ledges of gold-bearing rock from which the famous Henderson placers were washed; but however this may be, they have running through their ground a gold-bearing quartz ledge of great width, but as yet unexplored. The work done by this company has been confined principally to the development of silver lodes on another part of their ground. The silver ledge is very similar in every way to the Combination, the formation being the same, and the assays show from 35 to 70 ounces silver and from \$3 to \$5 per ton gold. The Sunrise is one of the coming properties.

OREGON.

GREENHORN.—*Bedrock Democrat*, Feb. 18: The Stevenson, Scott & Smith Co. is making arrangements to erect two arrastres in the spring to work the ores taken from its mines near Susanville. The Esple is informed that its Quartz gulch ledge is showing up well and that it has a large quantity of rich ore taken out. Smith Bros., of Susanville, have two hands at work on the Princess mine. They have been doing some repair work on the outside, but are at present ready to enter the tunnel, with a view of tapping the ledge at a short distance. The Smith Bros. have expended considerable money in developing the Princess ledge, and have hopes of getting out some good ore this winter. A letter recently received from Jack Coyle in Greenhorn, is to the effect that men are daily arriving at Granite, and that the outlook for a big boom in that camp during the coming year is bright indeed. Mr. Coyle has not had great faith in that camp in times past, but now believes that it will soon become the largest camp on the Pacific coast. Let's all hope that Mr. Coyle's predictions will prove correct. Extensive operations are about to be put in force toward a thorough development of the Cabell mine. Mining engineers have already been to look over the property with a view of opening the mine so the ore can be obtained in large quantities to keep the mill at steady work. If the intentions of the company are carried out, there will be a large force of miners employed to successfully handle the work that will be necessary for the fulfilling of their plans. The Cabell mine is considered to be one of the representative mines of the Northwest. Extensive work has already been done, and up to the present time the ore obtained has proved the great value of the property. There is no doubt that the present owners are men with means, and that a large amount of capital will be expended for a thorough test of its worth. All miners on Greenhorn are still progressing with their work with very gratifying results.

WASHINGTON.

THE SWANK MINE.—*Cor. Ellensburg Capital*, Feb. 18: The last heavy snow assures plenty of water, and plenty of water means plenty of gold. The coming season without doubt means the most prosperous ever seen on the Swank. The Delig & Powers hydraulic claim is all rigged up. The pipe, giant and flume have all been refitted and it is now one of the best outfits in Kittitas county, and, if handled right the coming summer, is going to make a big re-

turn for the fortunate owners. B. C. Pilcher, of Port Townsend, proprietor of this old Black claim, is back in camp getting ready for the next season's run. It is not necessary to say anything of this well-known property. The \$4000 taken out last summer with only \$300 expenses speaks for itself. The Green Tree Co.'s claims, bonded to Spokane parties, will not run the coming season unless the said Spokane parties pay their debts contracted last season for hired help and material furnished. The prospects are that this is going to be the greatest season for placer mining ever seen on the Swank. Quartz mining has been at a standstill, owing to the snow and cold weather, except a few claims. T. J. Vinton has been working on the Homestake part of the winter. He had several assays made in Ellensburg last week. The results are about the same as those made last summer, \$14 per ton free gold. The owners of the Buck Horn had some ore tested by Mr. J. C. Hubbell, the assayer, of Ellensburg. The result was \$75 per ton free gold.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 14 1893.
491,629.—HAARDER AND REAPAR—Abel & Daly, Maxwell, Cal.
491,792.—BUTTER-MOLDING MACHINA—P. O. Andressen, Ferndale, Cal.
491,696.—LATCH AND LOCK—J. E. Armstrong, Santa Cruz, Cal.
491,866.—TRANSMITTING GEARING—H. C. Behr, S. F.
491,632.—CULTIVATOR—C. Bizi, Selma, Cal.
491,514.—DANTAL FORCEPS—C. E. Blake, Sr., S. F.
491,515.—DANTAL FORCEPS—C. E. Blake, Sr., S. F.
491,516.—DENTAL FORCEPS—C. E. Blake, Sr., S. F.
491,517.—DENTAL FORCEPS—C. E. Blake, Sr., S. F.
491,518.—DANTAL FORCEPS—C. E. Blake, Sr., S. F.
491,519.—DANTAL FORCEPS—C. E. Blake, Sr., S. F.
491,834.—COFFEE URN—F. E. Browne, Los Angeles, Cal.
491,536.—PENOL SHARPENER—G. Diez, Santa Clara, Cal.
491,883.—PAPER HOLDER AND CUTTER—E. J. Gillespie, San Jose, Cal.
491,807.—HORSE DETACHA—I. A. McCaslin, Santa Clara, Cal.
491,855.—GAS ENGINE—J. W. Raymond, S. F.
491,814.—LOOK NUT—G. C. Richards, Sisson, Cal.
491,815.—HORSE DETACHA—Geo. Riley, Vallejo, Cal.
491,955.—FISHING RAIL—Jos. Singer, Los Angeles, Cal.
491,863.—SAED PLANT—G. A. Stine, Spokane, Wash.
491,612.—CAA COUPLEA—W. W. Swank, Seattle, Wash.
491,932.—DENTAL FORCEPS—A. Whitlock, San Bernardino, Cal.
22,223.—DIGN FOR SPOON—Birmingham & Grandjean, S. F.

The following brief list by telegraph, for Feb. 21 will appear more complete on receipt of mail advices:

San Francisco—James W. Kerr, rope shaver or wheel; Andrew W. Livingston, rans-riding machine; Max Sichel, producing dental cement; Albert W. Smith, constructing armature cases for electric motor and dynamo. California—Charles W. Barrett, Lemore, lemon squeezer; Fred M. Brawn, Oakland, condenser for electric railway; George W. Chambers and B. F. Gruver, Bitter Water, retractor for carriages; Seth D. Coombs and R. A. Frates, pinbar; William P. Miller, Redding, recovering precious metals; Peter L. Younger, Oakland, brick kiln.

Oregon—John S. and C. E. Baker, Newburg, cooking and smoking apparatus; Julius Graaf and J. M. Lemore, Portland, extension table.

Washington—L. C. Deiman, E. Wilson and C. Eaton, Spokane, recovering gold; Robert Sears and L. B. Lindsey, Spokane, bridle bit.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PAAS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LATCH AND LOCK.—John E. Armstrong, Santa Cruz, No. 491,793. Dated Feb. 14, 1893. The object of this invention is to provide simple and effective means for locking and releasing the main bolt, and to provide for the convenient location of the locking device in the knob, spindle and the key-way in the knob, whereby the latter may be easily found, and the necessity for a separate key-way and escentcheon avoided. The patent is an improvement on one granted to the same inventor, Sept. 27, 1892.

HOASE-DETACHA.—Irving A. McCaslin, Santa Clara, assignor of one-half to James A. Allen. No. 491,807. Dated Feb. 14, 1893. This is one of that class of horse-detachers in which the thill-coupling bolts are adapted to be withdrawn, to disconnect the shafts from the coupling clips, by means of a power device arranged at a point between the opposite bolts, and adapted to be operated by suitable connections from the vehicle above.

ADJUSTABLE MAP OR CHART STAND.—J. H. Kanfman, Marysville. No. 491,358. Dated Feb. 7, 1893. This is one of that class of stands

for suspending maps and charts in which a horizontal arm or bar, which carries the map or chart, is supported upon a vertically adjustable rod, mounted in a hollow standard. The object of the invention is to provide a stand adapted to be vertically adjusted to different heights, and to be adjusted axially to different angles, said stand being adapted to receive successive supporting arms for different maps or charts, and to permit the arm with its map or chart, when in place on the stand, to be turned from a horizontal position, in which said chart can be exhibited, to a vertical position in which it is out of the way.

BUTTER MOLDING AND CUTTING MACHINE.—P. O. Andressen, Ferndale, Humboldt Co. No. 491,792. Dated Feb. 14, 1893. The invention relates to butter-manipulating machinery, having for its object the molding and the cutting of the butter into squares. The invention consists in the novel sectional bed for the butter, the means for periodically advancing said bed and feeding the butter to the cutters, the means for relieving the advanced end of the butter from the underlying bed and cutting said end both lengthwise and crosswise into squares, the means for operating the cutters, and the means for separating and discharging said squares.

Market Reports.

The Markets.

SAN FRANCISCO, Feb. 23, 1893

Silver Product in 1892.

An epitome of the Mint Director's Report for 1892 with reference to the precious metals was published in the local papers on the 21st. The figures were somewhat muddled, and there was an absence of harmony in the mixture between the several papers, no two publishing the same figures. As near as we can decipher the statements, the product of gold in the United States for the calendar year of 1892 was, in round numbers, \$33,000,000, while the product of silver was \$8,000,000 fine ounces, of the commercial value of \$50,750,000, or within a fraction of 87½¢ per fine ounce. The value of the gold was the same as the year before. The product of silver was 330,000 ounces less than in 1891.

Though silver shows a falling off of only 330,000 ounces, and while the coming value of the quantity produced is only affected to that extent thereby, the commercial value shows a considerable falling off. For example, the commercial value of the 58,330,000 fine ounces produced in 1891 was \$57,630,000, whereas the commercial value of the 58,000,000 ounces produced in 1892 was only \$50,750,000. With only a decrease of 330,000 ounces of product, there has been a difference of \$6,880,000 in the value of the total product. This decrease in value has made an important item in the welfare of more than one mine where the cost of production left but little profit in 1891. As a result, several mines have been obliged to suspend operations to the great detriment of property and labor interests.

The silver product of the United States since January 1, 1878, and the gold value of the same, have been as follows for each calendar year:

	Fine Ounces.	Commercial Value.
1878.....	34,960,000	\$10,270,000
1879.....	31,550,000	35,430,000
1880.....	30,320,000	34,720,000
1881.....	33,260,000	37,850,000
1882.....	36,200,000	41,120,000
1883.....	35,730,000	39,660,000
1884.....	37,800,000	42,070,000
1885.....	39,910,000	42,500,000
1886.....	39,440,000	39,230,000
1887.....	41,260,000	40,410,000
1888.....	45,780,000	43,020,000
1889.....	50,000,000	46,750,000
1890.....	54,516,300	57,225,000
1891.....	58,330,000	57,630,000
1892.....	58,000,000	50,750,000
Total.....	627,056,300	\$648,633,000

At present prices, it is safe to say the limit of silver production in the United States has been reached. A better guarantee than 85¢ per ounce is needed as an incentive to further development along this line. Of course there are some mines that can make a profit on silver at 50¢ per ounce, or even 25¢ per ounce. An investigation made a year or two ago revealed the fact that silver could be produced as low as 9¢ per ounce, and in one mine it was produced without cost, as the profit on the lead in which the silver was found more than paid the expenses of operation. But taking the business as a whole, under existing circumstances, silver must average over 75¢ per ounce to keep any considerable number of mines open. The competition of Mexico must ever act as a depressing influence in the business of silver-mining in this country.

Mining Dividends in January.

The Engineering and Mining Journal reports \$1,015,900 paid in January by 28 mines in the United States, including \$500 from the Belden mica mine in New Hampshire, \$12,500 from the Great Western quicksilver mine of California, \$20,000 by the Minnesota iron mine in Minnesota, \$20,000 by the Napa Consolidated quicksilver mine of California and \$15,000 by the Pacific Coast borax mine of California. The remainder was from gold and silver mines, including \$75,000 from Alaska and \$88,000 from six mines in California. There was \$97,500 from the Seven Stars mine of Arizona.

Eastern Silver Markets.

New York, Feb. 9.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.
Thursday.....	38½	83½
Friday.....	38½	84½
Saturday.....	38½	84½
Sunday.....	38½	84½
Monday.....	38½	84½
Tuesday.....	38½	84½
Wednesday.....	Holiday	...

MINING SHAREHOLDERS' DIRECTORY.

COMPILED WEEKLY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT. LEVIED, DELINQUENT AND SALE.	SECRETARY.
Andes B M Co, Nevada.....	39.....250.....Jan 21, Feb 21, March 16.....	J W Tiggs, 349 Montgomery
Butterfield Placer & Gold M Co, California.....	1.....100.....Jan 28, March 8, April 5.....	R George, 419 California
Belcher M Co, Nevada.....	45.....500.....Feb 8, March 14, April 4.....	U L Perkins, Mills Building
Belle Isle M Co, Nev.....	17.....100.....Jan 9, Feb 11, Mar 8.....	J W Pew, 310 Pine
Bell & Belcher M Co, Nevada.....	17.....100.....Jan 16, Feb 24, March 14.....	L Osborn, 349 Montgomery
Bodie Cons M Co, California.....	15.....250.....Feb 13, March 3, April 17.....	H D Walker, 309 Montgomery
Caladonia M Co, Nevada.....	45.....100.....Jan 23, March 2, March 23.....	A S Groth, 419 California
Challenge Cons M Co, Nevada.....	14.....100.....Feb 14, March 16, April 6.....	O L McCoy, Mills Building
Cons M Co, Nevada.....	7.....100.....Jan 9, Feb 11, Mar 8.....	J W Pew, 310 Pine
Crocker M Co, Arizona.....	13.....500.....Jan 16, Feb 21, March 15.....	A Waterman, 309 Montgomery
Crockerbank M Co, California.....	3.....100.....Jan 6, March 2, March 24.....	J W Pew, 310 Pine
El Leopoldo M Co, Mexico.....	2.....500.....Jan 24, March 1, March 23.....	J W Pew, 310 Pine
Eschequer M Co, Nevada.....	35.....100.....Jan 23, March 17, May 6.....	C E Elliott, 309 Montgomery
Full River Cons M Co, Nevada.....	10.....200.....Feb 7, Feb 10, Mar 3.....	A H Thompson, 309 Montgomery
Hale & Norcross M Co, Nev.....	18.....500.....Jan 27, March 6, March 26.....	J W Pew, 310 Pine
Independence M Co, Nevada.....	2.....500.....Jan 23, Feb 6, Feb 18.....	T Wetzel, 309 Sansone
Jackrabblit M & M Co, Nevada.....	2.....500.....Jan 6, Feb 7, Mar 2.....	E C Elliott, 309 Montgomery
Justice M Co, Nev.....	33.....250.....Feb 20, March 27, April 21.....	H D Walker, 309 Montgomery
Mud M Co, California.....	16.....100.....Jan 28, March 6, March 30.....	L C Breece, 250 Montgomery
Morgan M Co, California.....	24.....100.....Jan 9, Feb 13, March 7.....	J W Pew, 310 Pine
Navajo M Co, Nevada.....	8.....100.....Jan 23, March 3, April 3.....	L R Grayson, 331 Pine
North Belle Isle M Co, Nevada.....	4.....100.....Jan 2, March 4, March 31.....	J W Pew, 310 Pine
North Cinnabar M Co, Nevada.....	66.....250.....Jan 10, Feb 14, Mar 7.....	G D Edwards, 414 California
Poor M Co, Arizona.....	14.....500.....Jan 23, Feb 21, Mar 21.....	A Waterman, 309 Montgomery
Rebel M Co, Arizona.....	13.....500.....Jan 23, Feb 21, Mar 21.....	A Waterman, 309 Montgomery
Seibeler & Slides M Co, Nev.....	11.....250.....Jan 5, Feb 7, Feb 27.....	E B Holmes, 309 Montgomery
Silver Hill M Co, Nevada.....	32.....500.....Feb 14, March 21, April 11.....	D C Bates, 309 Montgomery
Silver Kureka M Co, Cal.....	2.....250.....Jan 4, Feb 10, Mar 6.....	A Halsey, 309 Montgomery
Superior M & M Co, California.....	1.....500.....Jan 16, Feb 20, March 18.....	N W Hutton, 323 Front
Weston M Co, Arizona.....	53.....100.....Jan 19, Feb 23, March 15.....	P H Audros, 324 Pine
West Cons Virginia & Cal, Nevada.....	1.....250.....Jan 19, Feb 23, March 15.....	P H Audros, 324 Pine

MEETINGS.

COMPANY AND LOCATION.	MEETING. SECRETARY AND OFFICE IN S. F.	DATE.
Hale & Norcross M Co, Nevada.....	Annual.....A B Thompson, 309 Montgomery.....	March 8
Indian Creek L & M Co.....	Annual.....C O Mills, Mills Building.....	March 7

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Butterfield Placer & Gold M Co, California.....	5.....	L Osborn, 349 Montgomery.....	Oct 20
Champion M Co, California.....	10.....	T Wetzel, 310 Pine.....	Dec 19
Cins New York M Co, Nevada.....	10.....	O E Elliott, 309 Montgomery.....	Feb 16
Great Western Quicksilver M Co, Nev.....	25.....	A Halsey, 328 Montgomery.....	Oct 8
Mayflower Gravel M Co, California.....	25.....	D M Kent, 330 Pine.....	Dec 20
Pacific Coast Borax Co, California.....	100.....	A H Clough, 233 Montgomery.....	Jan 10
Standard Cons M Co, California.....	10.....	J W Pew, 310 Pine.....	Dec 23

San Francisco Metal and Coal Market.

ANTIMONY.	STEEL.
For B.....@ 13½	English, B.....@ 18
BORAX.....@ 8	Oanton tool.....@ 15
Refined, in car lots.....@ 8	8½ Diam tool.....@ 15
Powdered, do.....@ 8	Pick & Hammer.....@ 10
Concentrated, do.....@ 8	Machinery.....@ 5
All grades jobbing at advance.	The Calc.....@ 4½
COPPER.	TIN PLATE.
Bolt.....@ 22	B, V steel grade.....@ 5 5/8
Rheabing.....@ 22	14x20, spot.....@ 5 5/8
Ingot, jobbing.....@ 14½	Charcoal, 14x20.....@ 5 5/8
Do, wholesale.....@ 14	Do roofing, 14x20.....@ 5 5/8
Fire Box Sheet.....@ 24	Do, do, 14x20.....@ 11 7/8
IRON.	PIO TIN.
Bar, base.....@ 3	Spot.....@ 24
Norway, base.....@ 4½	OOAL.....@ 24
PIO IRON.	TO LAD.
Eglington.....@ 20	Spot.....@ 80
Glenbrook.....@ 21	Greta.....@ 7 50
Am. Soft, No. 1.....@ 22	Nassau.....@ 6 50
Oregon.....@ 20	Gluhan.....@ 6 00
Puget Sound.....@ 20	Good Bay.....@ 5 50
Olaf Lane White.....@ 22	Oannel.....@ 5 50
Langdon.....@ 22	Egg, hard.....@ 12 00
Thorvalf.....@ 23	Oumberland, in sacks.....@ 10 00
Gardner.....@ 23	Do, bulk.....@ 14 00
Barrow.....@ 23	Walstead.....@ 7 25
Carroll.....@ 22	Scotch Split.....@ 7 50
CHROME IRON ORE.	Brynm.....@ 7 50
Perton.....@ 10	West B.ley.....@ 8 00
LEAD.	TO LAD.
Pig.....@ 4½	Australia.....@ 6 37½
Bar.....@ 4½	Liverpool Steam.....@ 7 00
Sheet.....@ 4½	Scotch Split.....@ 7 00
Pipe.....@ 6	Cardiff.....@ 7 00
SILVER.	Lehigh Lump.....@ 11 00
Drop, sizes smaller than B.....@ 25	Oumberland.....@ 12 00
B, at 25 lbs.....@ 51	Egg, hard.....@ 10 00
Do, do, larger sizes.....@ 51	West Hartley.....@ 7 50
B, at 25 lbs.....@ 210	OO.....@ 00
Swk, Balls and Chilled.....@ 210	English, to load, 39 50.....@ 10 00
Do, 3/4 bag of 25 lbs.....@ 210	Do, spot, in bulk.....@ 10 00
QUICKSILVER.	Do, in sacks.....@ 11 50
Home trade, per.....@ 41 50	Oumberland.....@ 9 50
For export.....@ 35 50	

Mining Share Market.

The principal topic of conversation in connection with Comstock mines is the proposition to drain the lode, now being considered. At a meeting of managers and superintendents of Comstock mines, held at the offices of James L. Flood and John W. Mackay in the Nevada Block, there were present John W. Mackay, James L. Flood, D. B. Lyman, A. C. Hamilton, H. M. Gorham and others. A plan to reduce expenses and to begin pumping the water out of the lower levels, with the view of resuming deep mining, now that the upper levels have been well worked out, was considered. D. O. Mills, H. M. Yerington and others who represent railroad and other interests which are dependent upon the Comstock mines for support, were not present at this meeting. After a general discussion of the necessities of the hour, it was deemed prudent, before calling upon the stockholders of the mines for the money required to pump out the lower levels, to get some accurate data regarding the feasibility of the scheme, and D. B. Lyman, W. E. Sharon, R. P. Keating and A. C. Hamilton were employed as a committee to employ expert engineers to furnish data and estimates of the cost of pumping under certain conditions.

"You see," said John W. Mackay to the reporter, after the meeting had adjourned, "we don't feel like going into this pumping business until we thoroughly understand what the cost is to be. If we find it feasible and that it will not bankrupt the companies we will try it; otherwise we will drop it and let matters take their natural course. What we want are some statistics upon the subject, and it will take three or four weeks to get them. For my part, my only interest is in keeping miners employed, for times on the Comstock are hard indeed."

It is understood that after the committee appointed has obtained its statistics as to the cost of pumping, the miners' unions at Virginia City and Gold Hill will be asked to submit to a reduction in wages, which are now \$4 per day, and that the railroad, water, wood and other interests will be requested to make corresponding reductions, so as to offset the cost of pumping.

To a reporter W. R. Eckart, the engineer secured by the Pumping Committee to obtain the data to be embodied in its report, said: "An impression prevails that we can get our report on the feasibility of pumping out the lower levels of the Comstock ready in two or three weeks. This is wrong. Please inform the public that it will take two, and very likely three months, before we can lay the matter before the companies in proper shape. Our task is gigantic, and even at that is only a preliminary one,

before any pumping can be done, itself a great undertaking. I go to Virginia City some day next week and meet the committee there. Our first work will be to ascertain how much water was being pumped from the lower levels years ago, when all the pumps were in operation; that is, when they were boding the water down in the bottom of the mines. We will also have to ascertain the cost of that work. To do that we will have to go carefully through all the old books and records. Then we will have to compute the quantity of water which now flows every shaft, winze, drift, crosscut and other openings in the entire lode, and make allowance for the inflow, the situation of the ground, and the formation of underground lakes caused by caves. Having secured this data, we will have to decide where the pumps can be placed so as to work to the best advantage, and then will come the question of what appliances it is best to use and the cost. What I have enumerated are only a few details of our great work, and the public will see that we cannot do this in a hurried way. These and many other details secured, we shall make up our report, and then it is for the stockholders to judge whether it will be best to pump or allow matters to remain as they are."

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, Feb. 23, 1893.

9:30 A. M. SESSION.	
500 Andes.....	4½ 500 Gould & Curry.....95c
30.....	45c 500 Hale & Norcross.....1.10
350 Bullion.....	60c 200 Mexican.....1.80
5.....	50c 100 Overman......35c
100 Best & B.....	1.65 200 Occidental.....15c
50.....	80c 200 Optic......20c
100 Crown Point.....	1.10 100 Potomac......1.30
200 Confidence.....	1.55 200 S. Nevada......1.40
200 Con. Cal. & Va.....	2.80 100.....1.35
1000 Eschequer.....	5c 200 Yellow Jacket......55c

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Assessment Notices.

FALL RIVER CONSOLIDATED GOLD QUARTZ MINING COMPANY. LOCATION OF principal place of business, San Francisco, Cal. Location of works, Plumas County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of February, 1893, an assessment (No. 10) of two cents (2¢) per share, was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 313-315 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 23d day of March, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of April, 1893, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
ADOLPH LORENBACH, Secretary.
Office, 313-315 Front St., San Francisco, Cal.

SUPERIOR MILL AND MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Placerville, El Dorado County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 15th day of February 1893, an assessment (No. 1) of five cents (5¢) per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at two offices of the Company, Room 2, No. 323 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 20th day of March, 1893, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 5th day of April, 1893, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors,
I. N. WITHROW, Secretary pro tem.
Office, Room 2, No. 323 Front St., San Francisco, Cal.

PUBLIC SALE

— OF A —

SILVER REDUCTION PLANT

THE TOMSTONE MILL AND MINING COMPANY, having no further use for its mill and furnace at Charleston, will sell at public sale, on the property,

TUESDAY, MARCH 21, 1893, AT 3 P. M.

To the highest bidder for cash: All of the property known as "The Charleston Mills," real, personal and mixed; consisting of one 20 and one 15-stamp silver mill; one 25-ton water-jacket lead smelter; dwelling house and other buildings; and including the land, mine, ditch and water right pertaining thereto; situated on the San Pedro river, nine miles from Tombstone, Cochise county, Arizona.

Terms of payment will be made known at the sale and ample time allowed to investigate the title to the property.

By order of the Board of Directors of the Tombstone Mill and Mining Company,

W. J. CHEYNEY, Secretary,
Tombstone, Arizona.



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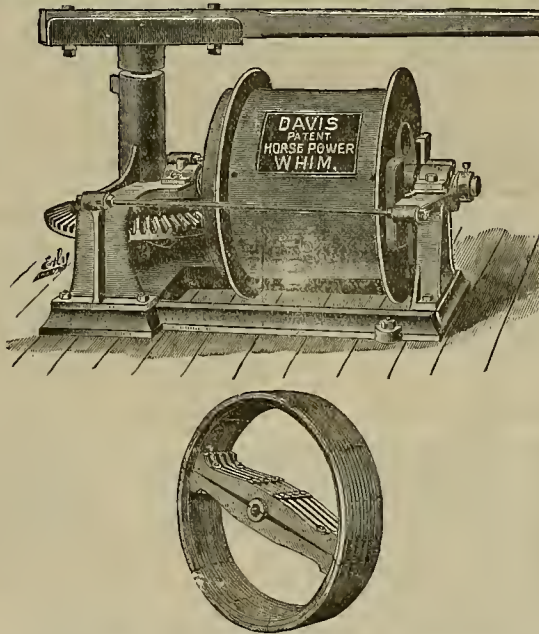
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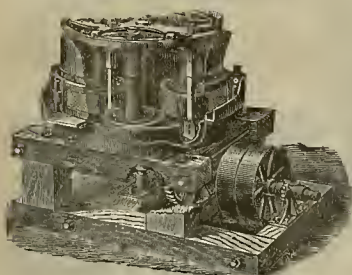
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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL LXVI. — Number 9.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 4, 1893.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

An Abnormal Borax Deposit.

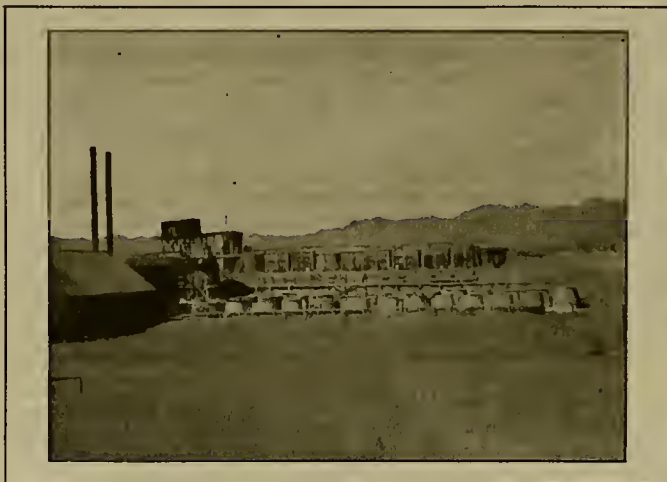
Nearly all the boracic deposits heretofore discovered have been found in the form of incrustations on the surface of marshlands, of nodules buried beneath the surface or of crystals imbedded in the mud at the bottom of shallow lakes. In a few instances these deposits are found interstratified with layers of earth and rock, the entire formation being in a horizontal position, as seen at several points in Death valley. But only in the Calico district, San Bernardino county, does one of these boracic deposits occur in the form of a regular vein, so uptilted that it requires to be exploited after the manner of a quartz or other ore-bearing lode. The cut here given shows the manner in which this deposit, standing between the walls of slate, is opened and worked.

This deposit, the property of the Pacific Coast Borax Company, is located on the southeasterly slope of the Calico mountains, or rather on a northerly spur of that range. This lode, which outcrops at intervals for nearly three miles, has an east and west course and a southerly inclination. The slate walls are inclosed in sandstone, superimposed upon which is a brecciated rock, evidently of volcanic origin. The crude material here consists of that variety of the borate of lime known as Colemanite. It is of a vitreous adamantine luster and exceedingly rich in anhydrous boracic acid. The contents of the fissure is six feet thick, and at a depth of over 200 feet holds this proportion, nearly pure mineral. The deposit has been opened by several shafts standing 100 feet apart, these being connected by drifts and levels. The material being easily broken down, but a small working force is required in the mine. All that is abnormal about this deposit of borax is easily accounted for. Originally, it was, no doubt, deposited at the bottom of a lake, where,

later on, great floods brought down a quantity of sediment which covered it up. In course of time this sediment having been converted into rock, the whole was then lifted up by some great convulsion of nature and left standing at its present angle, this movement having been most likely of a seismic character.

In the early history of the borax industry the works put up for the manufacture of this salt were of a very rude and primitive style. Owing to the great cost of lumber,

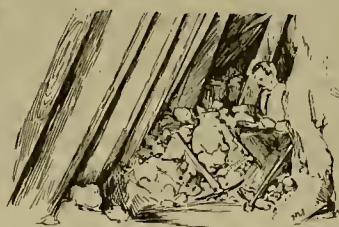
this article had to be economized to the utmost, the crystallizing vats and other portions of the plant being left uncovered, as shown in the cut illustrating one of these es-



PIONEER BORAX WORKS ON THE DESERT.



BORAX MINE.



INTERIOR OF THE MINE.

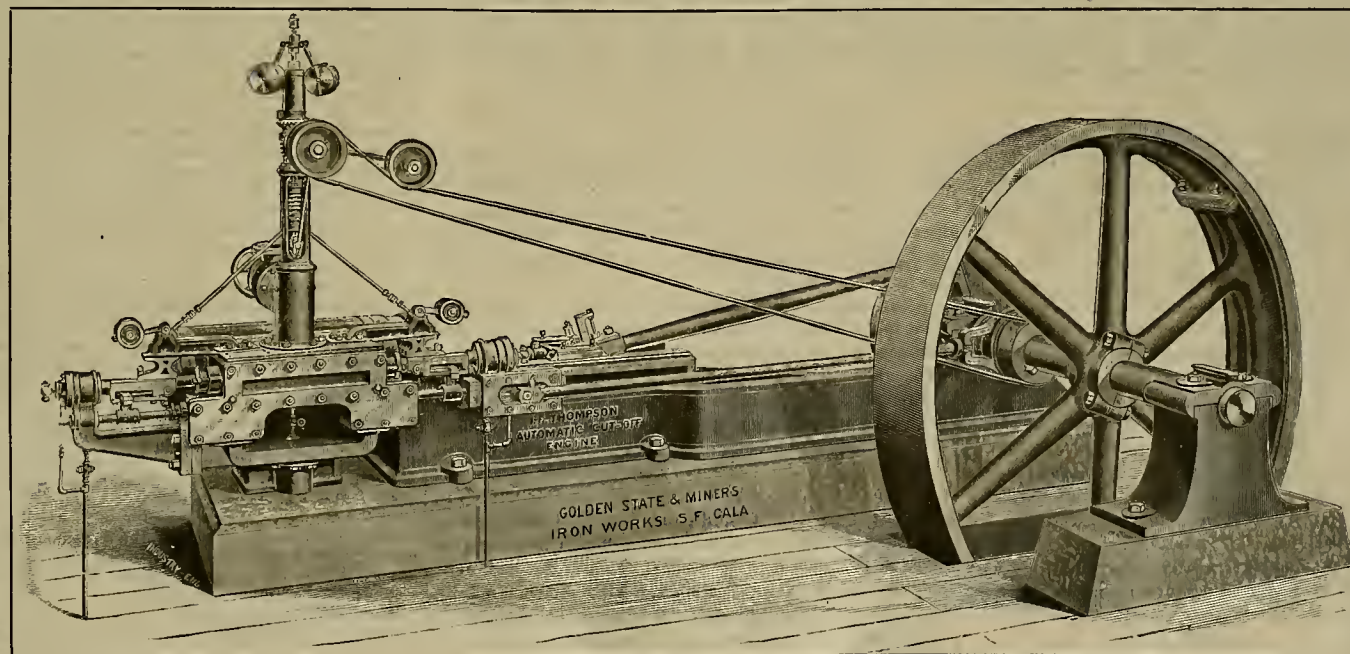
establishments. But in the hot and desiccated atmosphere that for two-thirds of the year prevails in that region, this was no detriment so long as the workmen could be

The Thompson Engine.

On another page is the description of the new Thompson engine built in this city by the Golden State and Miners' Iron Works for the World's Fair. A cut of the single cylinder engine of this improved type is given on this page. The Ferries and Cliff Cable R. R. Co. of this city is running its whole system with one of these engines. These are single cylinders, 24x48. The Los Angeles Electric Railway Co., the most complete plant in the State, has two sets of triple-expansion engines of this type. The cylinders are 16 and 22 by 32, and as high as 800-horse power is developed. The Pacific Rolling Mills of this city runs its machinery department with an 18 and 32 by 42 tandem compound engine of this make. The Oakland Gas, Light and Heat Co. has a 24x42 single cylinder engine for its dynamos. The Fresno Gas and Electric Co. at Fresno has a tandem 16 and 28 by 30 Thompson engine. The Norton Tanning Co. has the original Thompson engine—the first one built—a 14x30, which, after years of use, is so well liked that it would not take any other as a gift. The Mendocino Lumber Co. has the second one built, and sent recently a most flattering testimonial of its continued efficiency. The engines are made any desired size. They have been made as small as 8 and 14 by 24 tandem compound, and from that up to the sizes mentioned. The Golden State and Miners' Iron Works refer confidently to the owners of any of these engines as to their complete success.

CITY AND COUNTY ATTORNEY CRESSWELL has rendered the Board of Supervisors an opinion that the Board is entitled by law to fix rates for individuals or corporations furnishing light generated by electricity to the residents and householders of the city of San Francisco.

Mr. Cresswell holds that Section 19 of Article 11 of the State Constitution, which refers to "artificial light" and "illuminating light," embraces, by proper interpretation, light generated by electricity, and that inasmuch as the Constitution does not require the Legislature to pass laws in aid of the



I. F. THOMPSON'S SLIDE-VALVE CORLISS ENGINE.

protected in part, at least, from the rays of the sun, which here strike down with a killing heat the whole day long.

section in question, but confers the power of regulating charges upon the municipal government, the power of the Board of Supervisors is ample and unquestioned.

MINING AND SCIENTIFIC PRESS.

BY THE DEWEY PUBLISHING CO.

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W. B. EWER, EDITOR
CHAS. G. YALE, EDITOR

Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, March 4, 1893.

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Comment.

What is usually called the "desert regions" of this State in portions of San Bernardino, Inyo and San Diego counties, doubtless contains much wealth in its mineral deposits. A few years since we published in the MINING AND SCIENTIFIC PRESS a series of letters written by James H. Crossman, on the mineral resources of San Bernardino county, in which attention was called to many good prospects in the desert regions of that county. These were undeveloped mine, but the indications all pointed to a possible future for the section if capital would help the prospectors out. The fact that some of the successful Nevada silver miners have gone to work in Vanderbilt district on the Mojave desert, will soon attract attention to that part of the State, and other men will begin to invest. There is a large area only partly prospected in the counties mentioned, and although there have been many legends of rich mines, few have been opened. The New York district, on the Mojave desert in San Bernardino, is another district which is beginning to be noticed. They have found ore running from \$40 to \$68 per ton, and the bullion contains a liberal proportion of gold. The mountain ranges bordering the desert have been visited by very few expert prospectors or miners and a thorough search may result in the formation of several new districts.

Mr. J. J. Crawford, of Placerville, took his position as State Mineralogist this week in place of Wm. Irelan Jr., whose term expired March 1st. At first Mr. Irelan contended that he was entitled to one year more in his official position and declined to give way to Mr. Crawford, but better judgment prevailed and he sent word to the Governor by Mr. Davis, one of the Mining Bureau Trustees, that he was willing to vacate at once. A legal complication, such as was at one time threatened, would, without doubt, have jeopardized the appropriation for the Bureau, since it was "in the air" that there must be a change in the management if the Bureau was to go on and be properly supported. The bill defining the duties of the State Mineralogist and describing the method of conducting the Bureau has been favorably reported by the committees of both Houses, but has not yet passed. There is also a bill appropriating \$75,000 for the support of the Bureau, and this is still pending. Mr. Crawford, the new Mineralogist, is a gentleman of experience and ability, who will endeavor to make the Bureau of as much practical use as possible to the miners of the State.

Judge Hallett, of the U. S. District Court, at Denver, Colorado, has very sensibly decided that any stockholder in a mining corporation has a right to enter the mine and make an examination of the property to his own satisfaction. The decision was made in connection with the suit of Capt. Thatcher against the Mollie Gibson

Mining Company of Aspen. The Mollie Gibson has, during the last 12 months, paid dividends amounting to \$1,800,000, and the January dividend has been declared this year; but while this is the case, stockholders have been compelled to blindly await results, as the managers refused admittance to any but the officers of the company, while workmen in the mine were sworn to absolute secrecy. It seems absurd that a stockholder, who is of course a part owner, should be kept out of the mine by the managers; yet the managers, that is the directors, often keep all the information to themselves. It is frequently the case that these directors, after election, only hold just enough stock to keep their seats, selling the balance. They can then wreck a company if they chose, with no chance of financial loss to themselves, while the bona-fide owners of the mine—the stockholders—have not a word to say. This has been so common a custom here that it has nearly killed the mining-stock market on this coast. Judge Hallett's decision is not only good law, but good sense—something which cannot always be said of judicial determinations. Stockholders in all mines should be permitted to see their property when they want to and know everything that an owner should about it. They have pending before the Colorado legislature a bill making it obligatory on the mining companies operating in the State to set apart two days out of each month when stockholders may visit the properties in which they are interested. The bill provides that this shall be done when a person or persons representing one per cent of the capital stock of any company shall apply for admission on the days so set apart. This gives the minority stockholders an opportunity to inspect the property in which they have an interest, and relieves the management of a property of the inconvenience caused by interruption at all times, except upon the two specified days.

There is a strong organized opposition to Senator Ford's bill legalizing hydraulic mining in this State, the Anti-Debris Association and Sacramento Trustees both having passed resolutions against it. This bill has already been reported favorably by the Mining Committees of the Senate and Assembly and passed the Senate. It will probably pass the Assembly also, despite the opposition. Only one man in the Senate voted against it. The bill permits any one to mine by any process wherever the same can be done without material injury to navigable streams or adjacent lands. The word "material" is what has mainly aroused the antagonism, though on general principles the Anti-Debris Association objects to anything which looks favorable to the miners. This bill only puts in the code what the courts have already decided to be legal.

Since the above paragraph was written, we received a dispatch on Thursday that this bill passed the Assembly by a vote of 50 to 20. It has already passed the Senate and will be signed by the Governor without doubt.

It is probable that Mr. Ford's bill to create a State Debris Commission, consisting of one man, to co-operate with the Government Commission, will pass. It has already passed the Senate by a vote of 30 to 5. The Caminetti bill having become a law, and provision having been made for consultation with a State Commission, Mr. Ford's measure should pass also. It does not become operative unless an appropriation is made by the Government for debris dams, and this is something for the future.

The Caminetti Hydraulic Mining Bill a Law.

The President of the United States has signed the Caminetti bill, and it is now a law. We have been hoping for some months to be able to write that sentence, since it legalizes hydraulic mining in California under certain specified conditions, and brings to an end a struggle which has gone on many years.

After the bill had passed both houses of Congress, it went to the President, and he referred it to the War Department for an examination, where it was held several days. Meantime, some officious clerk or subordinate had written an adverse opinion, because of the amount of unpaid work it might put upon the engineers of the Board of Commissioners. The bill, with these comments pinned upon it, reached the Secretary's desk just after Mr. Elkins had come in, followed by Mr. Caminetti. The latter explained the merits of the bill, and General Casey, coming in just at that time, admitted that, although he had never taken action upon it in his official capacity, he had individually approved it. Secretary Elkins remembered he had approved the bill himself last summer, and he accordingly ordered the clerk who had brought in the first report on the bill to take it back and write a favorable one, which was done. It was then sent to the President, who, on receiving the joint resolution passed by the California Legislature asking him to sign the bill, did so at once, and it became a law on Wednesday.

The fact is that the delegates of the State Miners' As-

sociation, when in Washington last year, had several conversations with General Casey and Secretary Elkins about this bill and some few changes were made at General Casey's suggestion, so they knew all about it and were favorably inclined, though General Casey knew it would add work to the members of the Engineer Corps who are to form the Commission. The Miners' Association delegates knew that this must be the case, and were therefore careful to consult General Casey a long time since.

We have published this bill in full twice, and commented on its various sections so frequently that the general features are familiar to our readers. The miners who desire to mine by hydraulic process must apply to the Government Commission for a license, and this is granted when the miner shows to the satisfaction of the Commission that he can impound the debris and keep it out of the navigable rivers. This is the main feature of the law.

It must be confessed that the new law is not entirely satisfactory to all the miners, or to the valley farmers either. The latter generally do not want to see any dams or any hydraulic mining. Some of the richer miners think they can get on without a law, under the recent court decisions. The general consensus of opinion, however, is in favor of the new law as legally settling a long-contested dispute. The miners will no longer have to deal with spies, with prejudiced judges or inimical anti-debris associations, but with an independent commission of engineers, free from political surroundings, unbiased and technically skilled in engineering propositions such as this is. The anti-debris spies will be out of a job, and the association will have no further "say." There will be no more levying of blackmail for illegal mining on the part of anybody. This law finishes that flourishing business, and the miners who break the law will be punished, as they should be.

So, altogether, though the original measure has been changed, even in its modified form it might have been worse for the miner than it is. Mr. Caminetti has worked hard and deserves credit for his exertions. It is but fair to say, however, that without the strong backing and efficient aid of the Miners' Association of California he could not have accomplished the passage of his bill. This is evident to those who know the facts of the long struggle.

Foundry Notes.

At the Golden State and Miners' Iron Works this week they completed ready for shipment a very handsome 300 horse-power compound engine which is destined to run one of the six lines of shafting in the Machinery Building at the World's Fair. It is the I. F. Thompson automatic, independent, cut-off, slide-valve type, and is entirely of California design and manufacture. The engine is handsomely decorated. The lagging on the cylinders is of California laurel, banded with oxidized copper. The machine work is bright while the castings are painted and gilded in a tasty manner. This type of engine has been very successful where introduced, and several of quite large size have been built.

In the Thompson form of construction, the valve rod is continued from the eccentric through the exhaust chambers, in each of which is a slide-valve attached to the rod and moved regularly by the motion of the eccentric. In each end of that portion of the steam chamber above the exhaust chambers is a separate slide-valve suited each to its steam port, and from each valve a rod or piston passes out through the end of the steam chest, carrying a trigger with steel face, and on the end a dash-pot to resist the momentum when the valve and rod are thrown.

Upon the exhaust valve rod, at each end of cylinders, is an arm with steel face, which, coming in contact alternately with the trigger upon valve piston at each end, moves the valve off the steam port, and the steam being brought down to the steam port in undiminished volume and power, just enough enters the cylinder, which in its initial and expansive force is sufficient to do the work required for that portion of the stroke, when the wedge moved by the governor raises the trigger out of contact with the arm on the exhaust valve rod, and the steam valve is constantly closed by the pressure of steam upon the valve rod or piston within the steam chamber.

The wedge being set so as to trip the trigger when the engine is running at normal speed, under normal steam pressure and with a normal load, every change of load or of steam pressure in the boiler is instantly followed by a change of the position of the wedge backward or forward as the load or pressure is increased or diminished. For instance: Suppose the normal conditions are 80 pounds pressure of steam, 100 revolutions and the cut-off at one-fifth stroke. Now there comes an added load or the pressure of the steam is decreased. Instantly the governor feels the change, draws the wedge back, allowing the valve to move that much farther off the port and more steam to enter. Again the load decreases or the steam raises, the governor instantly moves the wedge forward and closes the steam port that much earlier.

The governor for these engines is of a new and peculiar design and very simple. It consists of an arrangement of centrifugally-acting weights, the arms of which are so connected with the driver and parts to be driven that the connecting arms form toggle or knee levers. The angle at the junction of these knees is most acute when the governor is in a state of rest, and it becomes more obtuse with a corresponding increase of the knee power as the weights separate. In conjunction with the arms and weights is a spring so connected that its tension increases as the centri-

fugal force throws the weights outward, but as the power of the knees also increases, the two serve as a counter-balance for each other, and the governor thus becomes differential in its action.

All eight valves are moved by one eccentric, and but one joint between the eccentric and valves.

Engines of this build are running with the most uniform motion under the most sudden changes of load, and with remarkable economy of steam, of sizes—12 in. bore, 24 in. stroke; 14 in. bore, 30 in. stroke; 16 in. bore, 30 in. stroke; 24 in. bore, 42 in. stroke; 28 in. bore, 48 in. stroke; 10 and 17 in. bore, 24 in. stroke, compound; 12 and 20 in. bore, 30 in. stroke, compound.

Its superiority over the Corliss style, the most approved heretofore, consists in—1st. Simplicity of parts, in having but one joint between the eccentric and the valves, against six in the most simple, and as high as 25 in other styles of the Corliss as now made, so that any intelligent engineer can run it. 2d. Plain, flat slide-valves and seats, instead of rotary or circular. 3rd. Sharper cut-off, insuring greater economy of steam. 4th. It can be run up to 200 revolutions per minute, against a possible 100 revolutions of the Corliss.

On the first page is an engraving of this form of engine, with some account of where it is in use on this coast.

THE Risdon Iron Works report quite a little "boom" in Bryan quartz mills, which are meeting with great favor among the miners. A contract which all the Colorado foundrymen were after came to this city because the Bryan mill was preferred for the plant by ex-Senator Tabor. This is a 60-ton free milling silver pan amalgamation plant on the tank system, consisting of four 4 foot sectional Bryan mills with eight 5-foot pans and four 8-foot settlers, with a 12 and 22 by 34 compound Myers cut-off engine, and 50x60 boilers. The whole machinery for the complete plant is made in sections for mule-back transportation. It is being built by the Risdon Works for Hon. H. A. W. Tabor of Denver, for the Tabor Mines and Mill Co., and will go to Santa Ednevijs, in Jesus Maria district, State of Chihuahua, Mexico. The outfit is a very complete one of the best design and workmanship.

The Risdon Works are also building about a dozen Bryan mills 5-foot solid, 4-foot solid and 4-foot sectional. These mills are giving satisfaction and there is an increased demand for them by miners. They have also in view a plant consisting of seven 4-foot sectional Bryan mills, with the necessary concentrators, etc., for gold ores.

THE Congressional appropriation bill this year has a provision which gives this coast a better chance in the future for building Government vessels. After authorizing the construction of four 1200-ton gunboats, the bill provides "that, in awarding the contract for any one of these ships, the Secretary of the Navy shall award the contract, at the price of the lowest bid, to that one of the parties bidding on any such ship which in his judgment it is in the interest of the Government to have to do the work." This will enable the Secretary to have one or more ships constructed on the Pacific coast, even if the first bids are not the lowest.

THE new water works at Golden Gate Park will be ready for use about the first of May. The old pumps, even when in constant operation, can supply but 250,000 gallons, while the new pumps can furnish a minimum of 1,350,000 gallons per day, and, when driven to their full capacity, can furnish 2,000,000 gallons. Enough water is thus provided for every requirement of the park when the improved part of its area is extended as far west as Strawberry hill. The water supply of the park is derived from eight artesian wells, the majority being 20 inches in diameter and 120 feet in depth. One of these wells is no less than 5½ feet in diameter and 130 feet deep, into which an extension has been sunk 90 feet deep and 20 inches in diameter. Of these wells, five are new and three are those from which the present supply is derived. They will furnish more than the quantity that will be required, and the quality is said to be extraordinarily good. The pumping engines, built by the Union Iron Works, are fine pieces of machinery. There are two independent sets of pumping engines of the horizontal compound type, the pumps being driven direct and attached to the back ends of the piston-rods. The high-pressure cylinders are 12 inches in diameter, and the low-pressure are 20 inches in diameter, 24-inch stroke. The pumps are of the double plunger type, 5½ inches in diameter and 24-inch stroke. The valve-seats are made of phosphor bronze, with hard rubber valves incased in a cast iron body with side doors, so that the valves can be easily examined and repairs expedited. The air chambers on the suction pipes are 12 inches in diameter and six feet six inches high, and the discharge pipes are also 12 inches in diameter and eight feet high. Each set of pumps has its own air pumps and condenser worked from the cross-head of the main engines. These are vertical, of cast iron and lined with phosphor bronze. The main engine frames are of cast iron of the Corliss type, with adjustable bearings. The pumps and engines are securely tied together by a bed-plate running the entire length of both.

The boilers are two in number, 54 inches in diameter and 16 feet long, and are known as the "elephant" type, to work under a pressure of 100 pounds per square inch. Each boiler will have two water-drums, 27 inches in diameter and 21 feet long, and a steam-drum, 30 inches in diameter and 10 feet long.

THE "Legislative Excursion" to Grasa Valley and Nevada city took place last Sunday, when about 200 persons, including members and attaches of the Legislature, went from Sacramento under the guidance of Assemblyman Thomas and Senator Ford. The visitors were hospitably received and were given an opportunity to visit the principal mines.

SEVERAL of the assistants in the State Mining Bureau were relieved from duty by Mr. Irelan before he relinquished his office. Among them were Messrs. Fairbanks, Storms and Preston.

Coast Industrial Notes.

A MUTUAL AID ASSOCIATION of telegraph and telephone men has been organized in this city.

It is considered a settled fact that an electric railway will be built from Sutter Creek to Ione, Amador county.

THOS. DIXON, of Eureka, Nev., has secured the lease of several rich dumps in Inyo county, Cal., for jiggling purposes.

THE steamer St. Paul, chartered by the North American Navigation Company from the Alaska Commercial Company to run on its new line established between here and Panama, will leave here on the 9th inst.

THE completion and operation of the smelter and reduction works now building in Los Angeles will do much to expedite the building of a railroad to Owens valley, and thus make the rich mineral belts of Inyo tributary to the enterprise of Southern California.

THE Great Salt Lake Railroad project is dead. All its employees, including Chief Engineer Kennedy and his corps of engineers, have been paid off and discharged. The opposition of the Traffic Association to the Consolidation bill is the cause of this action.

THE Oakland Council and Board of Public Works will compel all electric roads in that city to at once put up guard wires alongside its trolley wire. The only roads now using the guards are the new Telegraph avenue line to Berkeley, and the Haywards line.

THE new jetty at the entrance of San Diego harbor will be commenced at once. The plans have been prepared, and Colonel W. H. H. Benyard of the Engineering Corps of the army, will at once advertise for bids for the work. The cost will approximate \$500,000.

ARTICLES of incorporation of the Wentworth Boot and Shoe Company have been filed with the Sonoma county clerk. The capital stock is \$200,000, of which about \$40,000 have been subscribed by Santa Rosa capitalists. The concern was formerly operated in Oakland.

THE new 30-ton gasoline schooner Jessie Madsen, designed for the trade between Bolinas bay and this port, was launched from the ways at the foot of Taylor street at North Beach on Tuesday. The new schooner will replace the old Espinosa, which has been on the run many years.

J. H. HENRY, a capitalist, has made a proposition to the Sacramento City Trustees to erect a plant just east of the city, and supply the municipality with pure water from artesian wells sunk in the gravel-bed section, for 15 years, at the same cost as the city is now at for pumping from the river.

THE work of shipping the exhibits from the Pavilion to the World's Fair is about completed, and all that now remains is the private displays throughout the State, which will soon be forwarded, as before the 10th prox. all exhibits must be placed in the various departments of the State buildings.

A SYNDICATE of Chicago capitalists has been formed to supply water to the small towns along the line of the San Francisco and North Pacific from Healdsburg south to Tiburon, including the towns on the Guerneville and Sebastopol branches. The necessary water is to be obtained from the Russian river.

THE great pumping plant which will supply Yuma and Yuma Heights with water, and which will irrigate 10,000 acres of land on the high mesa near the town, started up on February 27th. It raises the water 80 feet and forces it through a 26-inch pipe three miles. The project marks a new era in irrigation, as it shows that the high mesa lands, worthless without water, can be reclaimed wherever water can be had for pumping. It also marks a new era in Yuma's prosperity.

THE Southern Pacific Company has ordered eight switch engines, 14 compound passenger engines and three compound freight engines. Those for the passenger service have ten drive wheels, and will be put upon the mountain divisions. But the freight compounds will be about the biggest engines that have ever been built. They have 12 drive wheels and weigh 55 tons on the drivers, while the total weight of the engines will be 135,000 pounds. The company will also build 500 freight cars at Sacramento this season.

A. W. JONES of Kansas, who is back of the Fresno and Monterey road, reports the enterprise moving forward with gratifying expedition. Monterey has collected all and San Benito nearly all of the required bonus, while the former's water frontage and a city franchise has been granted for 50 years. The right of way through these counties has been secured except that for entering Salinas, the granting of which there is no doubt. The chief engineer reports a grade not exceeding 80 feet to the mile through the mountains. Meantime, the local committee, securing Fresno's \$75,000 bonus, will visit Malaga, Friday and Saturday, in furtherance of the matter. Some \$40,000 has already been secured.

DUDLEY H. HERSEY, a wealthy lumberman and capitalist of St. Paul, who has been making a tour of the Pacific Coast with his wife, being asked about the purchase of timber lands in Oregon and Washington by Minnesota and Wisconsin lumbermen, said: "The timber purchased will not be cut at once. There is plenty of timber in Wisconsin and Minnesota, and the lumbermen have bought lands on the Pacific Coast so as to have a reserve in case of necessity and to supply local demand. Lumber could not be placed on the Eastern market and net shippers a profit under existing railroad rates, but in course of time, when there are more railroads built in the country and competition is active, the business could probably be put on a paying basis."

THE whaling steamer Jeanette was launched at Turner's shipyard, Benicia, on Saturday last. The Jeanette is the first atom whaler built on the Pacific coast. She is a very fine model, both for steaming and sailing purposes, and is very satisfactory to her owners, Messrs. Roth, Blum & Co.

of this city. The Jeanette, which is 350 tons, will be commanded by Captain E. W. Newth, formerly of the whaling schooner Alton, which has made so many successful voyages in the Arctic ocean. She will be ready for sea about March 25th, and has engaged some of the best whalers. She is to be fitted out with the very latest improvements in machinery and for the comfort of the officers and crew.

REGARDING the statement published to the effect that the Southern Pacific Company has just set to work a force of 1000 men in that section of country between Santa Margarita and Ellwood, Chief Engineer Hood says: "The fact is that we have not got 1000 men at work as reported, but only about 600, and these have been at work all winter. They are laying the new coast division that is to run between the places mentioned. Some time along in the spring we intend to increase the present force, but to what extent I can't say yet. As to when this division will be in operation, that I can't say either, but it will not be any time this year."

AN ORDINANCE was presented at the last meeting of the Santa Rosa City Council declaring that the public necessities demand a system of water works for the city. The question of Santa Rosa constructing and owning its water system has been under discussion for nearly two years. The action taken on Saturday is the preliminary step which will result in a proposition to issue bonds and construct water works being submitted to the voters at an early date. The city officers recently visited Santa Cruz and other cities that own their water works, and it is probable that an election will soon be called to decide the issue. If the proposition be carried a pumping system will probably be built.

J. A. LIGHTHOPE, District Engineer of the General Electric Company, read an interesting paper on "The Incandescent Lamp" before the California Electrical Society Monday night. Mr. Lighthope, who was employed in Edison's Laboratory for some years, gave an account of the many experiments made before the platinum filament was superseded by the carbonized bamboo now used in the manufacture of lamps. A general discussion on electrical improvements followed. The society has elected the following officers for the year: President, George P. Lowe; vice-president, O. C. Poole; treasurer, H. G. Bator; secretary, G. Max Caspari; executive committee—E. A. Roe, O. Brooks and B. Elder.

EX-SENATOR JAMES G. FAIR, in speaking before the supervisors' committee on establishing grades near Lobos square, explained that he proposed to make vast improvements in the neighborhood of Lombard and Bay streets, and that, as soon as the board had settled the grades, he would employ about 200 men in doing the necessary work. He said that he owned about 50 blocks of land, a considerable portion of which was under water. As soon as the grades of the streets on the beach property, from Van Ness avenue to the Presidio line, had been established, he intended to fill in the water lots and construct a concrete seawall. He considers that that neighborhood was destined to be the principal manufacturing district of the city, and he intended to invest considerable capital there in improvements.

A. M. CANNON JR., of the *Deseret News*, Salt Lake, says it has been generally dull throughout Utah for some time. In Ogden it has been unusually so, and it has been quiet in Salt Lake, but he thinks times will begin to improve soon. The past dullness has been to some extent produced by overgrowth, and it has required a little time to catch up. Now new enterprises are beginning to start again in different parts of the Territory, and the quiet period promises to end. "Salt Lake is so important a city and is such a natural business center for a vast region," said Mr. Cannon, "that it cannot remain inactive long. The spring that is just opening indicates that there will be a new impetus in nearly all lines of business, and besides this, there will be increased development of the mining, agricultural and other resources."

CAPTAIN JOHNSON, of the big three-masted schooner Beulah, brought his vessel from Redondo to San Francisco without a man in the fore-castle. The Beulah took 415,000 feet of lumber to Redondo from the north coast, and while discharging the walking delegate of the Sailors' Union captured her crew. Captain Johnson tried in vain to ship a fresh crew of non-union men, and when a crew went down from here was also captured he swore that he would never allow a union sailor to step foot on the Beulah's deck if she had to rot at her anchorage. It looked as though the schooner would rot for a time, but on the 18th Captain Johnson, tired of inactivity, sailed, with only himself, two mates and the cook to work ship. The donkey engine was used to hoist sails and the simplicity of the fore-and-aft rig enabled the four men to bring the big vessel to port safely.

HENRY C. MYERS, of Klamath county, Oregon, which lies immediately north of Siskiyou and Modoc, in California, and has Klamath Falls for its principal city, says there is now much interest in Klamath county, by reason of the construction of a new railroad from Castle Crag, on the California & Oregon road, to Klamath Falls. "The road is to be built by D. E. Miles, formerly of Chippeway Falls, Wis., and associates," said Mr. Myers. Mr. Miles is one of the head men of the Red Cross Lumber Company, and is president of the new railway organization. It is called the Northeastern California Railroad Company. The line of the new road has already been determined on as far as Bartel's, in Squaw valley, Shasta county, a distance of 30 miles, but it is stated that the rest of the road will be surveyed and run through as fast as it can be done.

MAX PRACHT, Special United States Agent for the protection of the salmon fisheries of Alaska, and lately instructed to utilize the island of Afognak as a salmon reserve, has finished his work in Washington, where he has been for some time, and is once more on the coast. Special Agent Pracht says that late figures collected by him show that the entire pack of salmon for the district of Alaska for the year just closed consists of 457,969 cases,

15,252 barrels and 4,245 half-barrels of salted whole salmon. Besides these there were 35 barrels and 36 half-barrels of salted salmon bellies. He gives the money value in San Francisco of the salmon, other fish and fish oil of Alaska for 1892 as follows.

Salmon.....	\$2,064.340 05
Codfish.....	104,062 00
Salted herring, herring oil and guano.....	86,537 50
Dogfish oil.....	3,000 00

Total.....\$2,257,939 55

The largest contract job on the water front for many years will be that for the foundation of the new ferry building. The bids opened last week, ran from \$328,500 to \$545,000, but none were accepted by the Harbor Commission as the plans are to be modified. While the board does not desire to cut the building in size, the members have suggestions for a modification of the foundation which will materially reduce the cost, and if they do not they will permit of construction by sections in such a manner that the whole can be finished about as planned as the fund for the purpose grows. In the new idea caissons to take in the full length of a row of foundation piers instead of a coffer dam for each pier, will effect an immense saving, and the plan of procedure will be worked out in a few days. A fact not generally understood is that the \$600,000 to be raised by the bond issue will be entirely required for the building proper, and the foundation, which is a work of about two-thirds the expense of the structure, must be paid for out of the harbor fund.

IRLAND & VICEY, contractors of Los Angeles, have secured the contract for constructing the canals and reservoirs to be built 60 miles east of Yuma, on the Gila river, Arizona, by the South Gila Canal Company. The engineering work has just been completed by Chief Engineer B. S. Church, of the New York water works, who built the celebrated Croton aqueduct. The canal system will cost about \$2,000,000, and will irrigate about 300,000 acres. It may be extended to include 1,000,000, and will bring an immense amount of arid land under cultivation and do much toward furthering Arizona's progress. Mr. Ireland says that the contract awarded to his firm includes about \$2,000,000 worth of work. There are 72 miles of canals and reservoirs to be built. The dam will be one of the largest in the country and will be made mostly of asphalt, some cement being used. It will be 1400 feet long, with a height above the water level of 32 feet and a depth below the water level of about 30 feet. The full force of men employed will be about 500, and it is thought the work will be completed in about a year and a half.

Mining Briefs.

THE loss of the Daly Co., Utah, through decrease in price of silver since 1891 is \$118,000.

PINOS ALTOS, N. M., has 75 stamps dropping on gold ore from the mines of that district.

CREEDE's ore shipments for January, '92, amounted to \$105,500; for January, '93, \$90,000.

THE Henry Mountains, Utah, are running opposition to the San Juan fields in the matter of new placers.

THE machinery agents say that the demand for mining machinery is very light at present in all the mining districts of the country.

THE miners of Silver City, N. M., held a meeting on March 1st to make arrangements for the Southwest Silver Convention, to be held at that place on July 4th.

THINGS are looking rather blue at Rich Gulch, Chisleva Co. The mill at the Quartz Glen Mine has been shut down and several men discharged. It is rumored that they will sink a new shaft in the near future.

SENATOR FORD has a bill appropriating \$500 for editing the manuscript of the report of the State Mineralogist for two years, ending Sept. 15th, 1892. This is the report of which the Governor spoke in his message as being too voluminous, and requiring better editing.

THE Supreme Court has accepted the new bond in the Hale & Norcross suit. The sureties are: Alice M. Hobart, \$1,000,000; Ella V. Hobart, \$1,000,000; C. O. Lane, \$300,000; Charity Hayward, \$600,000; W. J. Dingee, \$600,000. It will be noticed that the five persons qualified for over \$4,000,000, although the bond called for but \$2,030,000.

JAMES L. GOULD, the well-known miner of Gold Run, Placer county, has been cited to appear in Superior Court at Marysville, April 10th, to show cause why he should not be punished for contempt for violating an injunction prohibiting him from mining by the hydraulic process. Several other miners at Gold Run have also been cited.

WM. YANEY writes from Holtrock, A. T., about the San Juan country, saying that while there is a little gold all over the country, when they reach bedrock they find more. He thinks the excitement was arranged by certain storekeepers to make money out of the public. He says the gold dust reported to have come from the San Juan, was purchased elsewhere.

At a miners' meeting held in Antelope gulch in the lower end of the Little Hatched mountains, N. M., on the 14th day of February, 1893, the following mining district was formed, said district to include all the Little Hatched mountains from Howell's ranch to Rector's ranch: "Wines' Mining District, Grant Co., New Mexico." The recorder of the county is the recorder of the district.

MR. JOHN MACKAY, the bonanza millionaire who was shot by a crank mining-stock dealer named Rippey, is rapidly recovering. His assailant, who also shot himself, is in a precarious condition and not expected to live. Rippey had been dealing in stocks and losing money, for which he held Mr. Mackay responsible. Mr. Mackay did not know the man, and had never had any dealings with him.

THE last of the "lost mines" re-found is in San Luis Obispo county, four miles northwest of Beaus, which place

is near the first of the new tunnels of the S. P. R. R. Co. The usual accompaniments of old dump, old tunnel and abandoned arrastre, are announced. Moreover, there is an old Spanish mission mixed up with the legend. It is that of San Miguel, when they were supposed to have lots of silver from this mine.

THE *Park Record* (Utah) says that Joseph Frates, an old Daly miner, returned from a lengthy sojourn in Butte City, Anaconda and the Wool River country, and when told by one of his friends that it was very dull in the Park he exclaimed: "Dull! Why, man, it is lively here compared to the country I came from. The whole country is dead up there; absolutely dead. There is nothing doing and the miners cannot make a living."

By a recent decision of the attorney-general of the Transvaal, the MacArthur-Forrest Company was restrained from claiming a monopoly of the cyanide process in South Africa, and it was held that no process in which cyanide is used in a different manner is an infringement on the MacArthur-Forrest patent. The decision is the outcome of an attempt by this company to restrain a syndicate from using the Mallory process, which differs from the former only in the matter of precipitation.

Some Points in Silver-Milling by Amalgamation.

NUMBER II.

Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.

When an alkaline ore containing a haloid salt of silver (chloride, bromide or iodide) is to be treated, surfaces of copper are much better than of iron, for the reason that they retain a coating of quicksilver; this applies to raw and roasted ores alike. The philosophy of the matter is this: If the silver is reduced to the metallic state in the absence of quicksilver, that is, out of contact with the mercury, it becomes so mixed with the muddy pulp, and possibly rendered insensitive to amalgamation by superficial chemical action, that its collection is extremely difficult—in some cases impossible. Hunting for a needle in a haystack is hardly more futile than chasing those infinitesimal particles of silver through tons of mud. On the other hand, if the silver is born, so to speak, in contact with quicksilver, it amalgamates in the act. Iron in an acid pulp, or copper in either an acid or alkaline menstruum, forms with mercury an electro-chemical couple in which the iron, or the copper, plays the positive role, and it is known that, in such a case, the positive element of the electrolyte tends toward the negative element of the couple; in this case, the silver salt is the electrolyte and the silver is its positive element. In an alkaline liquid, iron is far less positive than in an acid, and though it remains positive to silver, and perhaps to mercury also, yet, as these metals do not adhere to it, even though mercury may be present, a large proportion of the silver chloride must be metallized by the side or wings of the pan, the surface of the muller plate, etc., out of the immediate proximity of quicksilver and is thus liable to escape amalgamation.

I once had occasion to treat an ore in which the main part of the silver was in the form of pellets of chloride and chlorobromide in cavities of the gangue. The gangue contained a large proportion of calc spar and manganous oxide, which made the use of bluestone and salt impracticable; the manganous oxide also forbids the application of cuprous chloride. Certainly, these things were not necessary for the reduction of the silver to the metallic state, for which the iron pan was sufficient in the presence of salt; but the work was begun with pans that were well lined with coppery amalgam from the previous treatment of a roasted coppery ore, and it was observed that as soon as that lining had worn off, the tailings were richer than before, the bullion being quite fine. Experiment showed that it would require a barrel of sulphate of iron to a charge of ore to neutralize the pulp so that bluestone could "live" long enough to coat the iron with copper amalgam, which, in this case, would be the only object in using it. I therefore made cement copper from bluestone in a tub, and added a quantity of that to each charge of ore in the pans. The result was a slightly coppery bullion, but considerably better yield. Had it been possible to treat that ore with metallic copper in a wooden vessel, the extraction would have been still better, not as in the Aaron process, because of the reproduction of cuprous chloride, which would have been useless, but because all of the haloid silver would have been metallized in actual contact with quicksilver.

Although the copper chlorides, with salt, are the best agents, in general, for the treatment of raw ores of silver (even for metallic silver the cupric chloride is useful, because it produces a film of silver chloride on the particles, which dissolves in the salt pulp and is recovered by precipitation, leaving the surface of the particle sensitive to quicksilver), yet there are cases in which the copper chlorides are inapplicable, and other agents may be used to advantage. One such I have mentioned and I have now to write of another.

The ore contained a large proportion of zinc-blends and galena, also pyrites and calc spar, but about 75 or 80 per cent of the silver was in the metallic state. I made a number of experiments on the ore, on concentrates of two grades, and on tailings, in an experimental pan taking a charge of 200 pounds; very fair results were obtained, at a cost of 90 cents per ton, by the use of dilute nitric acid. In this method salt must be rigidly excluded, else the mercury will be badly granulated; even without salt I had, at first, some trouble with the quicksilver, but that was overcome by using sodium thiosulphate in the settler. The effect of the acid was to clean and sensitize the surfaces of the silver particles before it could be destroyed by the zinc-blende, etc. Nitric acid may sometimes be used with a quartz ore carrying a small percentage of pyrites.

Failure, as well as success, may be instructive; it at least teaches us what not to do, and, if its cause is ascertained, it may point the road to success.

I was once called on to work, without roasting, an ore

which I thought should be roasted. For reasons which I do not remember, I crushed rather coarsely, then ground in Wheeler pans with bluestone and salt, but not quicksilver, and tried to amalgamate in Wakelee pans. The result was a low grade of amalgam and little of it, in fact a failure. I explain this on the theory that the silver mineral was metallized in the first pan, and, being mixed with the pulp, could not be successfully collected by quicksilver in the other pan, the more so as that other pan was of the slow-moving class. This view is sustained by the fact that the next man who tried got better results by amalgamating, as well as grinding, in the first pan. His results, however, were not satisfactory. I did not fail to work that ore, for it was then that I discovered the Aaron process, which was not worked in pans. I bought some of the coarsely-crushed ore from the company, and, taking it to where I could treat it in a barrel, extracted a high percentage in very fine bullion.

In those days, it was considered necessary to grind in the pan; I had long before proved that grinding was not necessary for roasted ore, but had not applied the idea in raw working. The proper way to work that ore in pans would have been to crush it as finely as necessary by the stamps (or otherwise), and then work it in pans with bluestone and salt, keeping the muller raised just enough to avoid grinding, and with enough of quicksilver from the first to wet, so to speak, the silver at the instant of its birth (*in statu nascendi*).

The lesson to be drawn from the failure of my experiment is, to avoid reducing the silver to the metallic state in the entire absence of quicksilver; my successor's partial failure was due to the rapid decomposition of the copper chloride, formed by bluestone and salt, by the clean iron surface and the iron powder resulting from grinding.

It may be objected that the universal practice, whether in the Freiberg barrel or the pan, is, and always has been, to reserve the mercury until the pulp has been worked for some time in contact with iron. As a matter of fact, however, a barrel or pan that has been used always retains a quantity of quicksilver and amalgam, and a new pan or barrel should not be charged without some quicksilver.

The practice of reserving the quicksilver seems to be an heirloom from Freiberg. The Freiberg process was devised by a chemist, and his object in delaying the addition of quicksilver was, to allow time for the scrap iron to reduce the ferric and cupric salts in the roasted ore to ferrous and cuprous salts, which are innocuous to the mercury. The chemical action is much less rapid in the barrel than in the modern pan, and a period of two hours was not very dangerous even if no quicksilver at all had been present, especially as the pulp was not heated by steam but only gradually, by the chemical action. In fact, however, there can be but little, if any, ferric or cupric salt in roasted ore, and I doubt much if the whole of the required mercury might not just as well, or better, be added with the charge of ore in either barrel or pan. The older metallurgists sometimes provided against dangers which had no real existence. For instance, in the Plattner process we are directed to roast the ore "dead" because ferrous sulphate precipitates gold from its chloride, but experience has proved that dead roasting is neither necessary nor desirable, as the ore often works better without it, to say nothing of the saving of time and fuel which fully offsets the greater consumption of chlorine to convert the injurious ferrous salt to the harmless ferric.

Again, at Freiberg, it was considered indispensable (at least the books so state) that a silver ore for roasting should yield 30 per cent of iron, or mixed iron and copper matte in an assay for matte. Every smelter and millman will admit the desirability of having a uniform grade and quality of ore to work, and this advantage the Freiberg metallurgists were able to command by mixing different ores, and by rejecting any that were unfit for roasting, and sending them to the smelting department, etc. But in this country we have not had those advantages, and we have found that we can sometimes do very good work with ores that would have been condemned as quite unsuitable for the process which alone we could command. In other cases, we have done the best we could. Pupils naturally tend to follow the instructions of their teachers, and servile imitation without proper regard to conditions too often results.

The Late Henry Martin.

Henry Martin, one of the owners of the famous Brown Bear mine of Deadwood, Trinity county, died suddenly this week after an illness of only two days. His wife, to whom he was devotedly attached, has been seriously ill for some time, and her life is despaired of. She has not yet been told of her husband's death. Mr. Martin was a very popular man and made friends with all with whom he came in contact. Although made very wealthy by his ownership in the mine, he was always the same plain Henry Martin that he was in poorer days.

President Neff of the executive committee of the State Miners' Association called a special meeting of the committee on Tuesday to take action on Mr. Martin's death, and a committee, consisting of John Hays Hammond, Julian Sontag and Chas. G. Yale, was appointed to officially represent the association. The other members of the executive committee also attended. At the meeting the following resolutions were adopted:

Resolved, That in the death of Henry Martin, the miners of Trinity county, and indeed those of the whole State, have lost a steadfast friend, and one who was unselfishly interested in their welfare. A practical miner himself, his great financial success in his vocation brought no change in his demeanor or feelings toward his old associates, although it enabled him more freely to exercise that liberality and generosity which was always part of his nature. As a member of the Executive Committee of this association, his advice was most valuable, and he has frequently come to its assistance in a material way as occasion demanded. A member of the Association from its inception, he has never faltered in his zeal for the miners' cause or doubted the ultimate results to be accomplished.

Resolved, That a copy of these resolutions be forwarded to Mrs. Martin, to whom we extend our sincere sympathy for her great loss.

Gold and Silver Mines and Mineral Lands in 1893.

A Random Record of Private Opinion on the Situation.

SHADY RUN, Feb. 25, 1893.

TO THE EDITOR:—The *Examiner's* call for a motto or watchword for 1893 was responded to by many of the wise men of the State and nation, and their contributions published in the issue of Jan. 1, 1893. These embrace a wide range, including nearly every position, profession and calling from the President of the U. S. to a justice of the peace. In this great array of wise sayings there is one important omission in regard to a common business matter, upon which, to a great extent, everything else depends. I suggest that the MINING AND SCIENTIFIC PRESS supply this omission by adopting for a motto: "Our Gold and Silver Mines and Mineral Lands in 1893." ("Money is, in one sense, the most important tool used by man."—Senator Stanford.)

A man may own 500 acres of land, but if he has no money to stock and cultivate this it is worthless. A company may own 1000 miles of railroad with rolling stock, but if it has no money to purchase fuel and pay employees it is useless. The miners own rich mines; if they are prohibited from working them, where is the money to come from? The conflict in regard to hydraulic mining has been on for many years past. There has been much writing and a deal of talking for it by its friends, and fully as much or more by its enemies against it. This controversy culminated in a joint convention of the belligerents in San Francisco in January, 1892. In this "tug-of-war" the hydraulic miners had got to the end of the rope and were just holding on, and it seems they were willing to accept anything almost that gave any hope of success. The labors of the convention and the hard work of the delegates sent to Washington has brought forth the Caminetti bill, a compound measure of hydraulic mining, river improvement and valley protection. The friends of the bill concede that it is not just what the miners want, but is the best that could be done. The convention that met in November, being composed pretty much of the same delegates that attended the January convention, either had to indorse the Caminetti bill or admit that nothing had been accomplished.

The movement, which originated in this county something more than a year ago, spread like a cyclone through the mining counties. Subsequent events indicate that to some extent it was a spasmodic outburst from the surface; everybody was interested and excited for a short time. It had the semblance of the excitement following a discovery of new and rich diggings. The convention that met in San Francisco in January, 1892, was the largest body of representative mining men that ever assembled in the State. Every delegate knew just what the hydraulic miners wanted. How many of them had devised and formulated any method by which they could obtain just what they wanted? Very few, I think. It seems that a great portion of the delegates went there to see what the other delegates were going to do about it. The result is the Executive Committee and the MINING AND SCIENTIFIC PRESS have done about all of the earnest, effective work. It is doubtful if the spasmodic efforts of convention under these conditions will ever accomplish the desired result. "Be sure you're right and then go ahead." The great difficulty is in coming to an amicable agreement in regard to what is the right start, as the success of everything depends on starting in right.

There has never been a time in the history of mining in California that required as great a degree of intelligence, energy and harmony on the part of the miners as the present. The agitation now on affords them a favorable opportunity to make themselves heard and felt, instead of, as at present, a race of go-as-you-please, every fellow for himself and the devil for the whole batch. Have a thorough organization, as the workers in all other industries have. Organize a central association in each county, with branches in every mining town throughout the county where ten or more live, energetic, "honest miners" can be found to take hold and work in earnest. The central association should meet once or twice a year to summarize the work of the branches. The branch organizations should be required to meet regularly, at least once a month, for the purpose of exchanging views, discussing all matters pertaining to their interest, suggest methods, relate experiences and make their business a practical study. Thus organized on bedrock principles of right and justice, and conducted on lines of harmony and unity of action, definite and reliable information could be obtained in regard to the mines and mineral lands, more liberal and broad-minded views embraced, local fads, extravagant ideas and absurd theories eliminated, and the dishonest practices of mining sharps who dig up railroad titles to oust prospectors from the mineral lands, and the moonshine hydraulickers, controlled. The recent spasmodic flights taken by the miners' associations, not knowing where they will light, will never accomplish what the miners want. Special mining bills passed by Congress will help their cause but little. They must organize, demand and work for what they want.

I think the best and only means to remedy all of the difficulties will be to establish a Department of Mines, through and by which the miners can bring their wants and grievances directly to the attention of the head of the Government and secure the necessary appropriations, without any aid and hard work from members of the lower House.

The gold and silver mines already discovered and developed, and the vast extent of mineral lands where new discoveries are being made every year, unmistakably demand that a Department at the head of the Government should be created, having exclusive control and management of this great and indispensable branch of industry. It is to be regretted that all the labor and energy expended on the hydraulic bill was not devoted to this purpose. There seems to be a growing tendency for the Government to go into a general "commission" business. Commissions are

now appointed for almost everything, with discretionary power to run different branches of the Government. Their rulings are the law and they construe and, being intrusted with the power, enforce them, thus centering in one irresponsible body, it might be said, the three separate and regularly constituted departments—the legislative, judicial and executive, besides the extra expense incurred and not being accountable for any mismanagement.

A Department of Mines established, with an executive officer at the head, he could appoint his assistants and agents to control and manage all of the details of the Department, without the objectionable "commission." The first and most important work the Department should undertake would be to reconstruct the mining laws, instead of intrusting the matter to lawyers and Congressmen who know nothing about the mines or the miners' wants. The secretary of the Department should request a body of experienced and able miners, selected from the different classes of quartz, drift and hydraulic miners, to dig up some of the old district mining laws and modify them to suit the present conditions, so that he could recommend their adoption by Congress. Since Congress commenced tinkering up the mining laws the miners have let go and expend their energies in kicking. Some of the present laws show an utter ignorance of the subject and the conditions, and every effort made to amend them seems to make matters worse. For example, the Stewart bill, limiting to 40 acres applications for patent to placer claims. This is extremely unjust and inconsistent, and shows a want of knowledge on the subject, or an indifference towards this class of miners. There is no distinction made between the classes of mines where there is a very great difference in the mines and their requirement. Where a gravel deposit is exposed on the surface the pay ground is all in sight, and 40 acres is a good-sized hydraulic claim.

The principal drift mines, however, are to be found underlying a hard lava capping, several hundred feet in depth, in the main divides between the present rivers. The pay is found in narrow channels, generally running diagonally across the section lines; and as the law requires that the location of placer claims shall conform to the legal subdivisions of the Government surveys, it is doubtful, under these conditions, if a location of 160 acres would embrace more than 40 acres of pay ground on the channel. In this character of mines there is nothing in sight but the surface indications to guide the prospector. The position of the pay ground can only be determined by actual work in running long tunnels that cost many thousands of dollars. The inconsistency of this bill is manifest in the 40-acre clause, which would require four separate applications to obtain patent to one claim of 160 acres, located and held under the provisions of Sec. 2330 Revised Statutes, which the Stewart bill does not affect. Mr. Stewart can make a good speech and may be good at making laws for quartz miners, but for placer miners he is an outrageous failure.

Things are growing from bad to worse and more of it. The law in regard to placer claims should enlarge the miners' rights and privileges instead of restricting them. There is a wide departure in the present and proposed law and policy from that of the old miners. The old miners recognized the necessity of making a marked distinction between ravine, canyon, river and hill claims. The district laws in regard to each class were suitable, just and liberal. To encourage prospecting, the discoverer of new diggings was entitled to an extra claim (something the Government could well afford to imitate). The policy was to enlarge the miners' rights and the size of claims as the diggings become more difficult and expensive to develop and work. This proposed amendment in the Stewart bill reverses the whole policy, and if carried out will virtually put a stop to prospecting for and discovery of productive drift mines. The individual prospector's occupation is gone, since it requires a large capital to develop the drift mines. Without the restrictions of this bill on this class of mines, it is almost impossible to induce capital to assist the prospector in the discovery of new mines of this character.

The Law Department rulings and the whole policy of the Government tends to drive the energetic prospector and capitalist out of the country. They will go to British Columbia, South America and Mexico, where a more liberal and just policy prevails. It is only by a thorough organization of the miners that the present straggling elements can be systematized and the mining industry put on a solid and permanent basis, and the evils complained of remedied by and through a Government Department of Mines. To sum up: Establish a Department of Mines, with a head chief, who shall have exclusive control and management in detail of the mining industry and mineral lands. The President of the United States to appoint competent engineers from the U. S. Army to make examinations of all of the conditions in relation to the hydraulic mines, adopt plans, make estimates of cost, advise and assist the Secretary of Mines in devising some practical method by which the hydraulic problem can be solved.

There is another problem of more vital importance to the future of the mining interest than the hydraulic mines, which, if generally permitted to resume working, we think we can see the end. This other problem is in relation to the definite settlement of what is mineral land (on which subject I will give my opinion later on). There have been many long articles written and fine maps made of mining sections that have been worked for the past 40 years, describing and showing what the miners have done, none of which give a particle of definite and reliable information in regard to well-defined unexplored mineral lands. It is left to the pioneer—the old prospector—under all of the present adverse conditions, to strike out into the mountain gorges and over the barren lava ridges to discover a paying mine to determine the mineral character of the land. A Department of Mines established, the secretary should have all of the mineral lands laid off into suitable districts and appoint a competent mineral surveyor for each district, who should not be interested in any mines or mining operations. Under instructions from the secretary, the mineral surveyor should prepare a map showing all of the legally-located claims and the vacant lands. Let

all lands in the designated mineral districts be considered mineral until its real agricultural value can be established upon a hearing had before the joint mineral and agricultural departments.

The placer-mining laws could be greatly improved in some respects, in my opinion, by adopting a modified form of the old pre-emption law. The mineral surveyors should survey the township lines where they have not already been run.

The application to locate a mining claim should be made to the Department, which should order the surveyor to survey and prepare a map, showing the boundaries, marked by permanent monuments, of the claim sought to be located. No "annual assessment work" should be required. The claimant should be required to commence development work within three months after the survey is completed and continue the same with reasonable diligence. Failure to commence work for the period of six months after survey is made, or a cessation of work for a period of one year, should cancel the claim and subject it to relocation. The claimants should be allowed, in unmining for drift mines, three years in which to complete the development work, which time might be extended upon a showing, in good faith, before the Department. All claims now located, for which a patent has not been issued, should be required to be surveyed and come under the same regulations and requirements as new locations.

The mineral surveyor should be supplied with an official seal, and when he has completed the survey and prepared a map of the claim, he should deliver a copy to the claimants with his signature and seal attached. Where there is a contest between claimants, the surveyor should refuse to make any survey of a claim until the matter is definitely settled. If some such law as is here outlined were enacted, mining locations hereafter made, and many now made, would be in the interest of developing mines instead of, as at present under the "annual expenditure" clause, locations are made for speculative purposes, and are held on to, waiting for the other fellow to make a strike.

There are hundreds of claims throughout the mining sections of the State, that are held under the present law, that have not had \$100 expended on them in the past ten years that contributed one iota toward any practical development. Instead of having to pay for the measuring off of 40 yards of high-priced red tape, and filling half a dozen pigeon-holes full of affidavits, to obtain a patent, require a royalty of a small per cent to be paid the Government, on the gross product of a mine when developed. There should be a distinction made between the different classes of claims. The law in regard to quartz lodes or rock in place might be amended by extending the width of claims on the surface, and giving no rights to anything outside of vertical lines drawn perpendicularly from the surface boundaries in any direction downward.

For placer mines of the hydraulic class, the present law is good enough; that is, 20 acres to a claimant, limited to 160 acres for a company of not less than eight. The ravine—canyon—and shallow surface diggings, requiring no capital to develop and work, could be governed by local district laws not in conflict with the laws of Congress. The most difficult class to determine the proper extent and limits of a claim to is the drift mines of the channel system. It is supposed that an individual claimant will not locate a claim of this class, on account of the large expense incurred in running long tunnels. I think a reasonable extent for a claim of this class would be, for a company of not less than ten, permit to locate one mile in length on the course of a channel, without reference to the number of acres embraced. As to limitation, no two or more companies, by uniting or consolidating, should be permitted to hold more than two miles in length on a channel. As the Government recognizes but two classes of lands—the mineral and agricultural—it seems to me that there is as much of a necessity for a mineral as an agricultural department. Then all of the Government lands would be under the control and management of the two departments. Joint offices could be established, with an officer appointed from each department, who could make a specialty of the class of lands embraced in their respective departments. All of the duties of the Interior Department might be performed by the Mineral and Agricultural Departments jointly, and the Interior Department abolished. This would make a radical change in affairs, but a great change is needful. We want something more definite and systematic in regard to the mines and mineral lands; something in keeping with the progress of the times.

With a Department of Mines established and in systematic working order, and a thorough organization of the miners, the gold and silver mines of 1893 will make a good start for getting back into the old lines of prosperity, and mining again be considered an honorable and respectable vocation.

J. F. TALBOTT.

AMERICAN MINERS IN BRITISH COLUMBIA.—During the promiscuous selling of mineral claims and tractions of mineral claims that has been going on on the other side of the line, many interests have been sold to men who have no miner's license, says the Nelson (B. C.) *Miner*. This is absolutely fatal to their title; no court of law can protect them; they cannot sue to eject the jumper, and in defending a case in a suit of ejectment they would be non-suited at once. Ambiguous on many points, the law is perfectly clear on this. In order to acquire the legal status necessary to hold mining claims in British Columbia, a man must invest \$5 in a license. If he neglects to do this he may be throwing away thousands. Nor is there any injustice here. A mineral claim is not a piece of real property, but simply a claim on the Government for a grant of a certain piece of land after certain conditions have been complied with, and this tax of \$5 is one of these conditions. In the States a man cannot locate a claim unless he has taken out naturalization papers. Here he pays \$5 like the citizens of the country, and can go to work on the same terms.

GOING TO SOUTH AMERICA.—E. R. Ray, who had charge of the Providence mine previous to last September, has

been appointed superintendent of the Playa De Oro Mining Company's hydraulic mine, near Esmeralda, Ecuador, South America. A full outfit for the mine has been shipped from San Francisco. Mr. Ray has engaged the following men to go to the mine to work: Archie Patterson, V. V. Blodgett, Ed Ryan of North Bloomfield, John George of Grass Valley, and others. Mr. Ray leaves here Tuesday. The men will go later.—Nevada Co. Transcript.

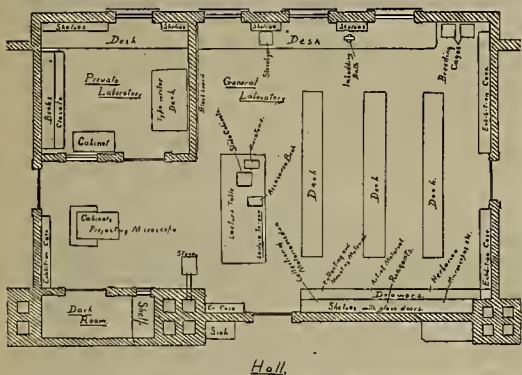
The University Laboratory of Entomology and Plant Diseases.

The growing demand for instruction in economic entomology and plant diseases has led to the equipment of a special laboratory for this class of studies in the Agricultural Experiment Station at the State University. Prof. C. W. Woodworth, who has charge of these subjects, recently prepared for *Science* a description and sketches of this arrangement and equipment, which we believe many readers of the *RURAL PRESS* will examine with interest. We reproduce from *Science* the full showing, as it embodies an arrangement for insect cases and a style of student's desk which may be suggestive to others who are working in this line on this coast.

There has recently been equipped at the University of California a laboratory for the study of the subject of plant diseases in its broadest sense; and, as there are but few if any others where the whole subject is taught as a unit, it may be well to give an outline of the equipment for this class of work.

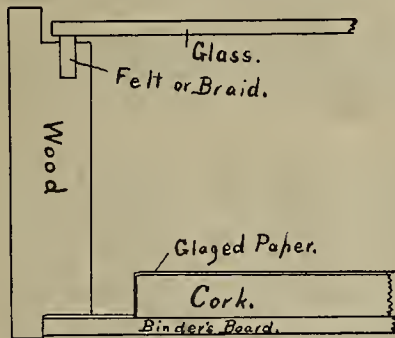
We will not consider that part of the equipment for this work afforded by the grounds, orchard, nursery, gardens and greenhouses of the agricultural department, but confine ourselves to the laboratory proper. The subject of plant diseases is now, and will continue to be, associated with that of entomology, so that the same equipment, to a considerable extent, serves for the two subjects.

The laboratory-room is something over 20 x 30 feet, and is situated on the north side of the Experiment Station building. It is lighted by four windows, having an entirely unobstructed view, and so giving ample light for microscope work. A corner of the room is partitioned off for a private laboratory, and a closet is fitted with a ruby window, affording an opportunity for photo and blue-print work. The figure below will give a good idea of the arrangement of the room.



The windows are all fitted with heavy shades working in grooves, enabling one to darken the room very easily and quickly when the lantern is to be used for illustration. The views are projected on a screen of tracing-cloth, which is mounted on an ordinary spring-roller and is ordinarily rolled up out of the way.

Besides the benches near the windows, which are used by advanced students, there are also three long desks, 1½ feet wide by 12 in length, that have proven themselves so convenient that a sketch of one is presented. As can be seen on the plan, these are so constructed that at the side of each student, boxes, the size of those of the collection, may be used as drawers, or boards may be inserted, forming shelves.



The boxes used for the collection are made as shown in the accompanying figure, and are, from their peculiar construction, not liable to warp or crack, and so remain perfectly insect-proof. The cloth bearing for the glass is treated with corrosive sublimate, and the paste and glue used are arseniated. These boxes are kept in cabinets, the glass doors of which are fitted with a rabbited groove on all four sides, thus making them also dust and insect-proof.

The collections kept in these cabinets are arranged in three series. Series one is the systematic collection, where the organisms producing injuries to plants are grouped in the ordinary order, beginning with mammals and ending with the higher plants. The second series is the "host"

collection, where the various plants are taken up in an agricultural order, as, for instance, seed crops, fruit crops, etc., and the injuries to each particular crop illustrated. In the third series, the symptomatic collection, all diseases having a common symptom are brought together, thus all galls and distortions from whatever cause, or on whatever plant, are assembled and classified.



Besides these there are the beginnings of a cryptogamic herbarium in drawers and a collection representing the *materia medica* of plant diseases.

There are in the laboratory a sterilizer and all the other necessary apparatus for this class of bacteriological work. For microscopical and histological work there is also a good equipment, including paraffin bath, microtome suitable for the highest grade of work, compound microscopes and accessories, and a very good outfit of reagents.

All reagents, as far as possible, are kept in standard strengths, and the bottles marked to serve as graduates for dilution. Thus the chromic acid is made up in a large bottle into a 5 per cent solution. The 1 per cent solution is made by filling the bottle to contain it to a mark and adding water. Most of the chromic mixtures are made from the 1 per cent. The chromic-acetic killing mixture, for instance, is made, as is indicated on the label, from ½ per cent chromic acid to the first mark, 95 per cent alcohol to the second, and 10 per cent acetic acid to the neck. Mixtures liable to deteriorate are kept in small bottles, and such as the acid-alcohols, for decolorizing, are not kept mixed at all, but large homo vials are properly labeled and the mixtures made up as used.

This sketch gives merely the present condition of the laboratory; it is expected that apparatus will be added from time to time, as opportunity offers, and as it is needed for the work in hand. Indeed, there is considerable new apparatus at the present time being constructed for the laboratory.

Bezoar Stones.

Eliza Brightwen, of Great Stanmore, England, contributes the following article to *Science*:

The almost fabulous value set upon bezoars in olden days, and the medical virtues often attributed to them, invest these concretions, which are found in the alimentary canal of animals, both wild and domestic, with a certain amount of interest; and, although belief in their curative power has long since passed away, it may be deemed worth while to try and put together a few items about their history and uses.

The name of bezoar appears to be derived from the Persian *bad* (expelling) and *zahr* (poison), in allusion to the supposed virtues of the stone as a remedy for snake-bites and other wounds. Others again derive it from the name of the goat in which one variety is found.

These stones were introduced as medicines in the East by the Arabian physicians in the tenth century; there seems to be mention of them in Greek or Latin authors, but from the East their use gradually spread into Europe. They are referred to by Frampton as far back as 1580, and as late as 1746 these stones were in use in England, being found in the London *Pharmacopoeia* of that date. A severe blow to their reputation was administered by Ambrose Pare, who gave a dose of bezoar to a criminal condemned to death and to whom arsenic had been given; death, however, was the result.

In the Royal College of Surgeons' Museum of London, cases may be seen filled with all the various kinds of concretions which have been found in the intestines of different animals, including some very fine bezoars.

They may be roughly divided into six classes:

1. Balls composed of animal hairs.
2. Those composed of vegetable hairs.
3. The Oriental bezoars, composed of ellagic acid.
4. The Occidental bezoars, formed of resin or bezoardic acid.
5. Concretions of phosphate of magnesia, ammonia and earthy calculi.
6. Ambergris, found in the intestines of the whale.

We will briefly notice facts relating to each of these classes.

I. Animals, especially horses and oxen, are much given to licking each other and themselves, and the loose hairs being swallowed become felted into spherical balls of various sizes, generally black in color, with a hard, shiny surface, which often consists of phosphate of magnesia.

In the College of Surgeons' Museum there is one such hair-ball, taken out of an ox at Buenos Ayres, which measures 40 inches in circumference, and one of oval shape, found in a peccary, measures six inches by four in diameter.

II. Vegetable hair concretions are usually formed round some nucleus, such as a horse-nail, plumstone, or a piece of flint.

The setæ of the oat seem to have a constant tendency to form into spherical balls, and when felted they sometimes alternate with layers of phosphates, so that when divided the transverse sections of these are found to be marked by concentric lines.

III. The true Oriental bezoar is found in the wild goat of Persia (*Capra agagrus*), and is brought to India from the Persian gulf. In appearance it is black and hard, oval in shape, with a smooth surface, which has a peculiar shiny luster.

This stone consists entirely of ellagic acid, which is an

insoluble organic acid derived from certain constituents of the diets of the Persian goat. This acid can also be extracted from an infusion of gall-nuts when exposed to the air.

Bezoars were frequently set in hoops of gold or silver, having a chain of some metal by which they were suspended in the liquid to which it was desired they should impart their curative virtues.

Koemfer says: "In Persia all people of consequence possess one or more of these stones preserved with great care as valued treasures." A proof of their value is found in the fact that amongst the treasures sent to the Emperor Napoleon the First, by the Shah of Persia, were three bezoars valued at nearly £200.

Five hundred crowns (£125) have been given for one such stone, and Tavernier mentions one, weighing four ounces, which was sold for £150.

The diseases supposed to be cured by bezoars were of varied character, such as epilepsy, palpitation, vertigo, contagious fevers, etc. It is said to have been a custom in Persia to take a dose of powdered bezoar at the beginning of the year to protect the body from poison for the succeeding year.

They may have been useful perhaps in some cases, owing to the amount of bile contained in them, and also because they were sometimes steeped in infusions of active medicinal plants.

IV. The Occidental bezoar.

This is found in the goat of Peru and India, and, as a rule, it is larger, lighter in color, and for the most part without the peculiar black metallic luster of the true Oriental stone, and is of much less value. The chamois yields what is known as German bezoar, and another similar stone is found in the llamas of Peru.

The high price of the Oriental bezoar led to numerous imitations, for the most part made of chalk and pipe clay, frequently gilded to give the high polish of the Eastern stone.

By putting butter of antimony under the action of nitric acid, an artificial bezoar can be made, and other imitations were made of vegetable resin identical with the litho-fellic acid of M. Goebel, which he found in a calculus examined by him. These stones are sometimes called resino-bezoardic concretions.

The snake stones of the Portuguese were probably made by the Brahmins, who pretended that they were taken from behind the head of the Cobra da Capello. They were called Pedra di Cobra, and were made of calcined bone-earth finely powdered and mixed with musk and aromatic gums. They were probably of use when applied to wounds, although not quite in the way imagined, for, being highly porous and absorbent, when applied in quick succession to a recent snake bite, these stones would naturally draw out the poison by capillary action. When one stone fell off, another would be supplied until the wound was sucked dry. Koemfer says 28 tones were needed to be applied to effect a cure.

Fossil bezoars are found in Sicily in sand and clay-pits. They are concretions of a purple color, around some usually organic body, and are of the size of a walnut.

V. Concretions of phosphates of magnesia and ammonia. The consideration of these calculi would hardly come within the limits of this paper.

VI. Ambergris.

Concretions found in the Spermacetti whale. This substance is found also floating on the sea upon the coasts of Japan, Coromandel and Madagascar. It is of very light specific gravity, ash-colored, with black veins and spots. It is supposed to be a product of disease, as it is only found in dead or sickly whales.

One more so-called bezoar may be mentioned, and then, as far as is known, all the various kinds will have been touched upon.

In the Malay Peninsula there is sometimes found in the cocoon a stony concretion, properly called *Callappitte*, which is worn by the Malays as an amulet of great value. This is so like bezoar that it is sometimes mistaken for it, although a purely vegetable product.

MINT DIRECTOR'S REPORT.—The annual report of the Director of the Mint for 1892 shows the value of the gold product of the United States to be \$33,000,000, about the corresponding average of recent years. The product of silver was 58,000 ounces, of the commercial value of \$50,750,000, a falling off of 330,000 ounces from the preceding year. The amount of silver purchased by the Government during the year was 35,129,327 fine ounces, costing \$47,394,291, an average of 37½ cents per fine ounce. From it 6,323,345 silver dollars were coined during the year. The imports of gold aggregated \$13,165,056, and the exports \$76,735,592, a net loss of \$58,570,536. The silver imports amounted to \$31,450,968 and the exports \$37,541,301. The amount of money in circulation, exclusive of the amount in the Treasury, was \$1,611,321,753 on January 1st, an increase of \$18,923,124 during the year. There was an increase of over \$12,000,000 in the gold product of the world during the last calendar year. Of this \$2,500,000 was from Australia and over \$9,000,000 from South Africa. The total silver product of the world was increased about 7,650,000 ounces, occasioned chiefly by an increase of 4,600,000 ounces in the product of Mexican mines and 2,400,000 of Australian mines.

GEORGE W. LICHTENTHALER, aged 60 years, of Bloomington, Ill., died at the Russ House, Feb. 20th, of heart disease. About a month ago he began ailing, and for two weeks had been confined to his room. He was one of the most noted conchologists and marine botanists in the United States, and had spent the past 20 years in studying and collecting the shells and fauna of the Pacific coast from Alaska to Mexico. He had been connected with the Smithsonian Institution for many years. Most of his specimens were gathered by himself, and his collection of shells and marine plants is the finest private collection in the country, and is very valuable, as it is completely catalogued.

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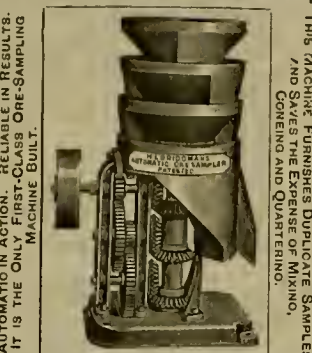
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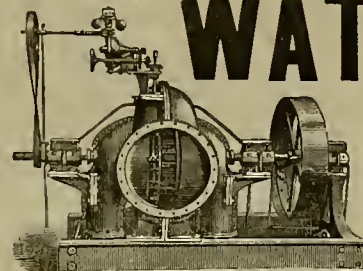


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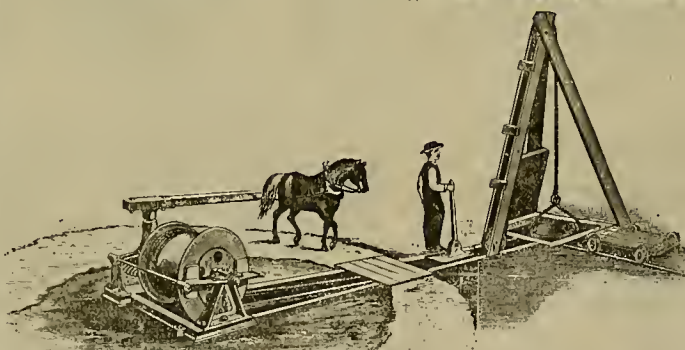
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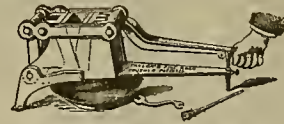
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Gas-Saving Appliances.

The introduction of natural gas, its lavish use and the subsequent lessening supply, says the *American Manufacturer*, have done much to hasten the development of appliances by which a given quantity of gas may be made more effective. The efforts in this line seem to have been exerted in perfecting appliances adapted to the use of fuel gas for domestic purposes, for since the natural fuel was first put in mills and manufacturing establishments, very few improvements have been made in the manner of its use. The great waste naturally resulting from the belief that the supply was unlimited, compelled gas companies to take means of regulating the gas, and the adoption of meters followed. This, of course, did a great deal toward stopping the waste, but it seems that practically nothing has been done to increase the effectiveness of the supply. No material change was made in furnace construction, and although a number of burners for the saving of gas in mills have been patented, their adoption was very limited. The desire early shown by the gas companies to ultimately restrict the use of gas to domestic purposes entirely is perhaps the chief reason why there has been so little improvement made in the method of using it in iron and steel manufacturing lines.

The same cannot be said of the methods of using fuel gas in the household. With the advent of natural gas in houses, it was natural that immediate efforts toward ornamentation in the appliances should be made. When it became evident that the supply was growing smaller, appliances for the purpose of decreasing consumption soon appeared on the market. When natural gas was first put into houses, the former stoves and grates were used, the only change being perhaps the addition of a few bricks or lumps of fire-clay. The gas was used in the most indirect manner, and the largest amount possible was taken to do comparatively little work. But the decreasing fuel supply hastened improvements, so that during the past few years greatly-improved methods of using fuel gas have been brought out. While improvements have been made in using gas for heating alone, greater advancement has been made in the appliances by which it is used for culinary purposes. New stoves, ranges, etc., are being put upon the market. For some of these great claims are made, but, aside from this, it is evident that the time is fast approaching when coal will be no longer used in the kitchen. There are ranges on the market to-day on which the cooking for families of fully average size has been done in Pittsburgh, at an expense of 60 cents per month. This, of course, was with natural gas, but it has been shown that the ordinary city illuminating gas, at \$1 per 1000 feet, is cheaper for this purpose than coal at present prices. Even greater claims are made for one pattern of a gas stove now being sold. It is claimed that this will do the work referred to at a cost of not more than 40 cents per month, and an ordinary family baking can be done at a cost of one cent for fuel. This stove shows one peculiarity which marks the development of fuel gas. In it the heat is applied directly, and it has no flue connection. This plan is open to the objection that it vitiates the atmosphere of a room with the products of combustion.

In spite of this objection, the latest heating device brought to our notice is on the same principle. In this heater steam is also produced, and in answer to the objection stated, it is held that the amount of carbonic acid gas generated is insignificant. However this may be, it is certain that in the past few months a large number of heaters, constructed without regard to outlet, have been put in use. The fact that the use of fuel gas for domestic purposes is rapidly increasing is shown in the growing business in that line of manufacturing. One manufacturing firm recently received an order for 700 gas stoves from Salem, Mass. In the smaller cities throughout the country the use of fuel gas is growing greater each month, and the trade in gas-saving appliances will make great strides in the near future.

Shop Suggestions.

A pair of calipers has been devised with a star wheel in one of the legs, near the toe, so that five different settings can be obtained with a single pair. Instead of having so many lying around on the lathe board. The star wheel is made to turn turret fashion, and can have each of the five points ground to any fraction of an inch, or arranged to suit tapers and allowances for shrinkages. If a star

wheel can be made to work so handily, and give such fine results, there is room for another on the other foot, which could be made to combine in a large number of sizes on the differential principle.

How many there are who have no idea how fine a course the pitch of the cross-feed of a lathe may be. Every feed-screw should be graduated into degrees and made use of whenever the calipers are to be depended upon, for a lathe tool can be brought to the same setting so nearly twice alike by this means that the difference, if any, can always be brought on the safe side, and while a cut is being taken just to see how much is to be removed by the next chip, by testing with a scale, and set the tool so near the desired size the first time, with the cross-feed, that the second set will strike it sure, instead of approaching it gradually by a series of approximations that are simply tiresome.

Who is able to fix up a temporary tool that will work only in the lowest place when turning up a casting on the face plate? It takes but the combination of two or more simple levers, one of which is to trail about on the surface of the work.

Another problem in the same line lies in an arrangement of levers that will regulate an end mill in such a way that a cavity can be routed out to just contain a given form for die-sinking. It took a smart mechanic over ten years to hit on the right way, while another had no trouble to see through it in about ten minutes. It all depends on getting a comprehensive view of the problem to commence with, whether there are to be years of time wasted in groping around in the dark.—*Boston Journal of Commerce*.

A COTTON BELT.—At one of the great elevators in the West, says the *Manufacturers' Gazette*, a belt is in use which has a surface speed of nearly 2800 feet per minute, the driving pulley being of 16 feet diameter. The duck, which is the sole strength of the belt, is made from the heaviest and strongest staple cotton, weighing 32 ounces to the square yard. The friction cements the plies so tenaciously together as to render it well-nigh impossible to separate them. The cover will not crack, peel nor readily chafe, and excludes all moisture or dampness from penetrating and destroying the strength of the duck, while an even, smooth, metallic surface brings it in more perfect contact with the pulley, and enables it to transmit more horse-power than a belt having a rougher surface. It is deprived of stretch to an extent that will prevent trouble from its becoming loose and flabby on the pulleys, but not altogether devoid of elasticity. By means of a powerful hydraulic stretching device it is subjected to a great strain. At the same time, the polished plates of a hydraulic belt press are brought to bear and exert on its surface a pressure of about 2000 pounds to the square inch, under which process it is brought to an even and uniform thickness throughout. After this has been accomplished, it is, by vulcanization, rendered proof against moisture, dry rot or decay.

MANNESMANN LOCOMOTIVE BOILER TUBES.—According to the *Eisenbahn Zeitung*, the Austro-German Mannesmann Tube Works have gone into the manufacture of locomotive boiler tubes by the Mannesmann process on a large scale, with satisfactory results. At the beginning of last year the Royal Railroad Commissioners at Berlin began a series of careful tests of the physical properties of tubes for locomotive work, and, on the strength of the results obtained, have not only concluded to henceforth fit up all their new locomotives with these tubes, but have also given heavy orders for Mannesmann tubes to be used for renewals. As a rather interesting and noteworthy novelty recently introduced in the manufacture of the tubes, the *Eisenbahn Zeitung* cites the fact that, while the tubes are of uniform outside diameter, they are made with the inside diameters varying from end to end, giving a tapering interior, and a consequently greater thickness of the tube walls at one end than at the other. Advantage is to be taken of this feature by placing the tube ends with the greater weight of metal toward the fire box end of the boiler, where there is apt to be most wear. At the smoke-box end, then, there would be less tube thickness, which, it is argued, would be conducive to a better utilization of the available heat of the cooler products of combustion.—*Railroad Gazette*.

FINE MECHANICAL WORK.—An instance of remarkably fine mechanical work is that described by Prof. Rowland, the distinguished microscopist, says an exchange, who has now succeeded in manufacturing a screw for his dividing engine which is said to be more nearly perfect than any other of the kind ever produced. It is made of the best steel, is $1\frac{1}{2}$ inches in diameter, 17 inches long, and with 20 threads per inch; was

first cut in a lathe in the ordinary manner, then ground by using a nut equal to it in length, which was placed on it with washed emery, and the screw revolved under a bath of water and oil maintained at a constant temperature. The grinding required about three weeks. It is to be used mainly in rolling gratings for spectroscopes, and it is thought will be capable of ruling a million of lines to an inch. In the head attached to the screw there are a thousand notches, so that the movement of a notch advances the thread 1-20,000 of an inch. It may be remarked that M. Behrens has lately stated to the Amsterdam Academy of Sciences that, under high powers of the microscope, the network in hardened steel may be made visible on polished slices without etching or annealing—the dark, sinuous lines answering to the bright ones shown by Sorby on etched slices, and it is proved that hardened steel contains hard granules bound up in a matrix of soft iron.

Scientific Progress.

Chemistry of Storage Batteries.

If a plate of lead, coated with peroxide of lead, be placed in sulphuric acid, it soon becomes covered with sulphate of lead as a result of local currents between the peroxide and the lead, or by simple chemical solution, so that in Plante and Faure's battery the peroxide is gradually destroyed independently of the main current. This action takes place slowly, as the sulphate of lead is deposited between the lead and the peroxide, and diminishes the local current. If no sulphate of lead were formed, the peroxide of lead would soon be consumed. The sulphate of lead is subsequently reduced by the hydrogen, forming spongy lead. By repeated charging, the quantity of finely divided substance increases.

If two electrodes that are covered with sulphate of lead be immersed in dilute sulphuric acid, and a current passed through them, one will become covered with spongy lead, the other with peroxide formed from the sulphate.

The peroxide formed upon the positive lead plate of the secondary battery becomes covered with an impenetrable layer which prevents the further production of peroxide; hence Plante leaves his battery at rest, which favors this formation of sulphate of lead.

In this way all the sulphuric acid can easily be taken out of the solution. A considerable quantity of oxygen will not be absorbed. According to Kabath, the interior plates of lead foil are rapidly crumbled, but the particles remain hanging between the other plates.

Dr. Gladstone ascertained that the local action which corrodes the lead plate supporting the peroxide of lead, thus impairing the value of the battery, took place during the formation of the battery, during the repose, and during the discharge, and it was an important question to determine what modification of the present arrangements would minimize or prevent local action. Dr. Gladstone presumed that the sulphate of lead formed in the secondary batteries could be oxidized as well as reduced, to yield peroxide of lead in the former, and spongy lead in the latter case, and thus to re-establish the initial state of the battery. The oxidation of the sulphate of lead was not doubted, but Sir W. Thomson said he had only been able to obtain a very spurious reduction, while Prof. Lodge failed in realizing any reduction of the lead sulphate. As this reduction was one point of Dr. G.'s explanation, both he and Mr. Tribe, who has always shared Dr. G.'s researches in this field, and Prof. Lodge, repeated their experiments, and *Nature* had communications from these two gentlemen, which both adhered to their former opinions. The question also occupied Sir William Thomson, who, experimenting with two platinum plates coated with sulphate of lead, making one the positive, the other the negative electrode, observed the oxidation of the sulphate on the former, but found a doubtful indication of a reduction on the latter electrode, though the action had been continued for six weeks. Dr. G. attached 20 grammes of the white sulphate of lead to the negative plate by binding it with parchment paper, and passed a continuous current of one ampere through the dilute acid in which were both plates. The greater part of the hydrogen generated at the negative plate escaped, but after 24 hours the gray metallic lead became visible through the wet parchment, and at end of ten days the whole of the sulphate was reduced to a gray spongy metal. Dr. G. convinced himself by analysis that the spongy mass was really nothing but lead. Dr. Gladstone thinks that the reduction of the sulphate of lead is an absolute fact, although it does not take place so easily as

the oxidation. Prof. Lodge recommenced his experiments with a view to ascertain, not whether the sulphate of lead was reduced in bulk by the nascent hydrogen, but whether any traces of metallic lead could be obtained on the negative plate.

Prof. Lodge immersed platinum electrodes in a paste of sulphate of lead, the two electrodes being about two inches apart. The paste was obtained by precipitating with sulphuric acid dissolved carbonate of lead, to secure a fine state of subdivision. When three Leclanche cells were used, the evolution of gas from both plates was powerful enough to form a halo round each, filled with only turbid liquid; but both plates showed a distinct but extremely thin coating of peroxide and metallic lead respectively. To avoid the strong evolution of gas, two cells only were used; the growth of peroxide was abundant, but the formation of metallic lead on the negative plate was even less perceptible than before, and the metallic lead was better deposited from the liquid above the paste than from the paste itself. Still, when electrolyzing a clear solution of sulphate of lead in dilute sulphuric acid, the solution being concentrated as much as possible with so insoluble a body as sulphate of lead, no effect was noticed. The experiment was modified by dipping the platinum plates into the clear liquid above the paste, barely letting them touch the mass; then the negative plate appeared blackened, while the positive one hardly received any deposit of peroxide except along its bottom edge. The possibility of a reduction is evident, but of no practical value if the deposit of one week could be dissolved in one drop of nitric acid, and if this solution gave no more than a faint precipitate with sulphuric acid. One might get over the contradiction in these two statements by supposing that Dr. G. was more successful as he secured a close contact between the electrode and the sulphate coating, while, in Prof. L.'s arrangement, the gas bubbles kept the sulphate particles away from the platinum plate. But some of Prof. L.'s observations do not admit of this interpretation, and we can hardly assume such conditions to correspond to those in a storage battery in which the supposition of a reduction seems almost unavoidable.—*Recent Advances in Electricity*.

The Wetting of Coal.

The scientist asserts that there is no economy to be gained by wetting coal, because, if the water is decomposed, it will require as much heat to effect the decomposition as is yielded by the reunion or combustion of the gases. There would rather, he says, be a loss, from the fact that the steam or vapor into which the water would be converted, whether dissociation took place or not, would convey heat away on its passage to the stack. On the other hand, the man who is constantly handling soft coal will tell you that it burns better and goes further if judiciously moistened, and he knows it.

An explanation has been suggested in the fact that wetting retards the immediate and violent distillation which follows the introduction of new fuel, and that under these circumstances decomposition takes place in the furnace, where the sheets get heat enough anyway, and the reunion or combustion of the dissociated gases takes place further along in their passage to the stack, where the heat can be better applied. In other words, the water, by its decomposition, takes heat from the furnace, and by its subsequent combustion distributes it over the heating surface of the boiler to better advantage than if it were concentrated under the first fire sheet.

Recent experiments, too, have shown that a considerable quantity of aqueous vapor is necessary to facilitate the union of furnace gases with the oxygen of the air. It may be to this fact, rather than to the extra flow of air induced, that the steam jet owes its efficiency as a smoke preventer.—*Power*.

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Electricity on Canals.

The question of equipping canals with electricity is now being agitated in several States. Governor Flower, of New York, has recommended that Erie canal be so equipped. He thinks that \$1,000,000 will do it, \$700,000 for 14 power stations and \$300,000 for putting up the poles and wiring them. He believes that current can be furnished the boats for 60 cents per craft per day. This would greatly reduced the cost of operating canal boats and would be a boon to the owners of such craft. Repairing the roadway is now a great expense to the State. This, the Governor believes, can be saved, and with the earnings of the electrical system applied to it, made to liquidate the bonds.

The project is entirely feasible. In addition to the benefits derived from installing a motive power cheaper than mule flesh, the mechanical and electrical trades would receive an impetus that would be felt everywhere. The construction of the immense engines, boilers and dynamos for the power stations would help to fill the shops with work. Their maintenance would give constant employment to skilled men, and the muleteers who now work for about \$10 per month and board, would, if they continued on the canal, have to acquire some knowledge of electricity or mechanics. The building of the motors for the boats would furnish a very large amount of work, and open up new fields for invention and design.

Taking every side of the question into account, no more feasible enterprise for a State, canal traffic and for the promotion of mechanical and manufacturing business generally could be entered into.—Scientific Machinist.

HOW IT IS DONE.—An interesting example of bringing of energy of a water privilege to a locality more convenient for manufacturing purposes is that reported of the Nonotuck Silk Company, which is supplying its mills at Leeds and Haydenville with electric-power generated at a rocky gorge a

third of a mile from one mill and $1\frac{3}{4}$ miles from the other mill. In one mill the motors directly drive lines of shafting, while in the other mill they act as auxiliary to the water-wheels and regulate them, and also with the engine at times. The motor belts upon the main shaft, which is driven by two water-wheels, the latter being run at full gait without any regulator, but the motor serves as a regulator, running at uniform speed and furnishing the remainder of the power. On the water falling too low for the water-wheels and motor to run the mill, a steam engine is hauled to the main shaft, the motor and water-wheels furnishing their full capacity and the engine regulating the whole. An important precaution, however, in this arrangement is mentioned, namely, that of setting the governor on the engine for a speed slightly greater than its proportion to the motor and water-wheels, so that it will lead, and also to prevent the motor tending to do more than its capacity.

The Conductivity of Insulating Bodies.

The effect of the physical condition of substances upon their dielectric properties is one that is deserving of more study than it seems to have received. In the *Philosophical Magazine*, M. Edward Branley, M. D., calls attention to the fact that very thin films of insulating bodies seem to become conducting, and that good conducting material opposes great resistance to the passage of a current when inserted in its path in a pulverulent condition. Thus far there is nothing in his statements that might not have been arrived at by *a priori* reasoning; but that the conductivity of the pulverulent mass may be measurably restored by the discharge of a Leyden jar in the vicinity and destroyed again by a slight mechanical shock, while not new, could scarcely have been anticipated by theory. The phenomena having been demonstrated, however, one or two theories at once suggest themselves as plausible explanations of their cause. There are one or two other phenomena of thin films or pulverulent dielectrics, however, whose explanation is not so obvious. For instance, if the two ends of a circuit be varnished with shellac, and after the latter is thoroughly dry be brought into intimate contact, the insulation against low potentials is practically perfect. But place this junction in an atmosphere of pure hydrogen gas, the resistance is gradually lowered until comparatively good conductivity is established, only to be destroyed again equally gradually when the hydrogen is removed.

Neither mechanical shocks nor moderate increase of temperature seem to have any perceptible effect upon the rise or subsidence of conductivity. But if the treatment with hydrogen be repeated after complete resumption of the insulating state in air, the junction cannot be restored to the same degree of conductivity it was made to assume in the first instance, and the effect of the hydrogen gradually decreases with each subsequent application, until it seems to disappear entirely. Carbonic oxide and artificial marsh gas produce the same effect, though to less degree, while natural marsh gas seems to be inert. The presence of carbonic acid, nitrogen, oxygen or other electro-negative gases, even in considerable proportion with the hydrogen, seem to have no effect upon the phenomena except what might be reasonably attributable to the dilution caused by their presence. On the other hand, if finely-pulverized, hard glass be imbedded in the two ends of the circuit, and they be brought together again as before, and hydrogen applied, a much higher conductivity will be attained than in the case where shellac was the dielectric; but it will not be assumed gradually as before, but in a series of impulses each succeeded by a non-conducting state, these electric impulses becoming more and more frequent until the current finally passes continuously with nearly the same freedom as it would were the conductor unbroken. On removing the hydrogen, the junction remains conducting much longer than where shellac is used, but loses its conductivity completely and instantaneously. Thus many substances have been tried with similar results, but differing in degree. But the manner of assuming conductivity and of losing it again seems to differ with each, and to be in a measure characteristic of the substance employed. A satisfactory explanation of these phenomena has not yet been suggested.

ONE of the new features of electric medication, says the *New York Sun*, is the introduction of drugs into the human body through the skin. This is done by placing solutions of any drug upon a sponge, which is made the positive pole and placed against the skin. When the current is turned on, the drug is actually driven through the skin into

the tissues. The application is not at all painful. Thus cocaine has been driven in over a painful nerve, and neuralgias have been relieved by it. Many other drugs have been used in this way. This property of electricity is known as cataphoresis.

Useful Information.

Yellow Pine and California Building Lumber.

In early times in California, when the saw-mill business was not reduced to such a science as it is now, many mill-owners placed their plants in the foot hills. They cut everything that came along, without regard to quality or usefulness. In these foot-hill districts the timber is of an inferior grade, spongy and liable to twist and split if exposed to the elements, and because of the many disadvantages of this lumber it has been given the name, bull-pine, a name which suggests the true nature of the wood.

All lumber from the foot-hills is of a similar character to bull-pine and is consequently condemned by our architects and builders. Of all pines, sugar pine is the most favored, and even that, when taken from the lower districts, is of an inferior grade.

During the past 15 or 20 years the mills have had to go back or higher into the mountains and the temperature, winds and snow exercise such an influence upon the timber that the mills of a higher altitude are able to produce a pine superior to any of the Eastern woods. Yellow pine, grown in the northern California mountains, is as firm and durable as any of the pines grown in the eastern part of the United States.

For standing finish, stepping, flooring, etc., and places where durability and strength are required, it has no superior among the soft woods. Another point in favor of it is its tendency to become light in color with age, while Oregon pine becomes darker under the same circumstances. The germs of disease cannot get such a hold on yellow pine as they can in redwood, white cedar, etc., and the delicate pitchy odor peculiar to yellow pine makes it its own disinfectant and especially adapts it to use in living rooms and hospitals.

I will venture to say from my own personal observations, during the past 25 years, that slash grain, No. 2, yellow pine flooring will outlast the vertical grain in Oregon pine or fir, for the reason that it wears smooth and does not splinter, while in vertical grain Oregon pine the soft fiber between the hard grain shrinks away and causes the piece to become rough and full of splinters. Scrubbing has no rotting effect but will make it whiter, while an Oregon pine floor will rot under an ordinary amount of scrubbing. While it is true that yellow pine costs a trifle more than Oregon pine, the benefits are increased four-fold.

If you will but notice the percentage of yellow sugar pine used in steamboat work, it will furnish convincing proof of the value of it for rough work and its ability to hold paint in spite of the many immersions in salt water.

A few words more in regard to our California woods. We have what is called Oregon pine or red fir and white fir or spruce. Our mountain red fir is better than Oregon or fir pine for railroad bridges and seems an excellent lumber for holding its shape, strength, etc. I mention these facts for the benefit of those who think we produce nothing but redwood and sugar pine.

Much more could be said in regard to our woods in general, but my humble pen is not equal to the task, of what is known by our California lumbermen in regard to a product that will some day form a great factor in our commerce and bring California among the first ranks of lumber-producing States.—Cor. California Architect and Building News.

Cost of Furs.

A skin of the sea-otter has been sold for as much as \$775. Sable skins, little bigger than a man's hand, have been sold for \$100 each, which is proportionately more expensive than the skin of the sea-otter. A mantle of this valuable sable fur was a gift to the present Empress of Russia on her coronation by the town of Vitouisk, in that country. It weighed 16 ounces and is valued at \$60,000.

The skin of an elephant, when tanned, is very expensive, the tanning taking about six months, says the *Boston Globe*. Articles made from elephant hides are costly luxuries.

The skin of a silver fox, otherwise called black fox, varies in price from \$50 to \$200. The whole number obtained annually amounts to only 2000, of which about 1600

are imported into England. La Hontan states that in his time the skin of the silver fox was worth its weight in gold, and an unusually fine skin has been sold in the London market for \$250.

Of the species of marten which is distinguished as the Russian sable, the darkest skins command \$150 each. Inferior skins of the same animal fetch as little as from \$1 to \$2.

A skin of the tiger of North China, which has hair from two to three inches long, and frequently measures from 10 to 14 feet in length, is valued at from \$50 to \$100.

Among expensive furs, Mrs. Mackay owns a set of black fox which cost \$14,000.—Chicago News-Record.

"Heart Failure" and Stomach Stuffing.

A physician writing to the *Medical Brief* says: I wish to say a few words about heart failure. We almost daily see reports of deaths attributed to heart failure. Now, what I wish to ask is, what is it the heart fails to do? I have always considered the heart the most perfect organ of the animal economy, and one that never shirks its duty. It commences its labors during the early stages of pregnancy, and goes on until the last moment of life, without one second's rest, night or day, often without the intermission of a single pulsation for 100 years or more. At every beat it propels two ounces of blood through its structure. At 75 pulsations per minute, nine pounds of blood is sucked in, and pumped out. Every hour, 540 pounds; every day, 12,960 pounds; every year, 4,730,400 pounds; every 100 years, 473,040,000 pounds. Verily a good organ and all performed without one moment's rest.

Now, the heart has the very meanest and most contemptible neighbor that ever an organ had, namely, the stomach; a drunkard, a glutton, a trespasser, and almost everything else as bad. Verily it ought to be walled in and compelled to keep on its own grounds.

The stomach lies directly under the heart, with only the diaphragm between, and when it fills with gas it is like a small balloon, and lifts up till it interferes directly with the heart's action. The stomach never generates gas but when filled with undigested food fermentation takes place and gas is formed, and the interference depends upon the amount of gas in the stomach. To overcome this obstruction, the heart has to exert itself in proportion to the interference, more blood is sent to the brain, and the following symptoms are the result: A dizzy head, a flushed face, a loss of sight, spots or blurs before the eyes, flashes of light, zigzag lines or chains, etc., often followed by the most severe headache. These symptoms are usually relieved when the gas is expelled from the stomach.

Now, when this upward pressure upon the heart becomes excessive, more dangerous symptoms supervene, a larger quantity of blood is sent to the brain, some vessel ruptures and a blood clot in the brain is the result, and the patient dies of apoplexy, or, if he lives, is a cripple for life.

When a sick person, or an old one, or one with feeble digestion sleeps, digestion is nearly or quite suspended, but fermentation goes on, and the gas is generated as before stated.

A man is found dead in bed, and the medical attendant pronounces it the result of heart failure, and such is the certificate of burial given. Now, the man was out, partook of a late supper, and ate roast beef, turkey, chicken, lobsters, oysters, mince pie, plum pudding, ice cream, cake, an orange, nuts and raisins, three or four cups of coffee, etc., went home at midnight, retired, and dies of heart failure before 9 o'clock the next morning. What did the heart fail to do?

Again, a man is sick with typhoid fever or pneumonia, or almost any other disease, and died, it is said, from heart failure; but what has his diet been during his sickness? At present it is very fashionable to commence at once with what might well be called the stuffing process—iced milk, which is so cool and grateful to the patient, from three pints to one gallon during the day and night. But if allowed to make a suggestion, I would say that in place of it, clam chowder, thickened with gravel, stones, eggs, beef tea, whisky, cream and all the other good things the poor patient can be induced to swallow.

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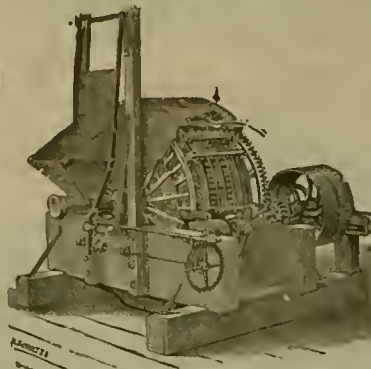
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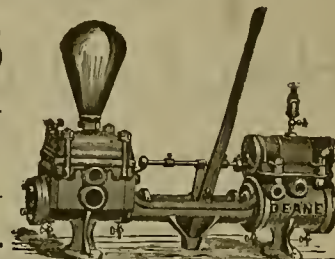
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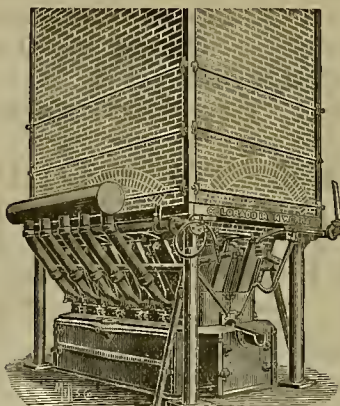
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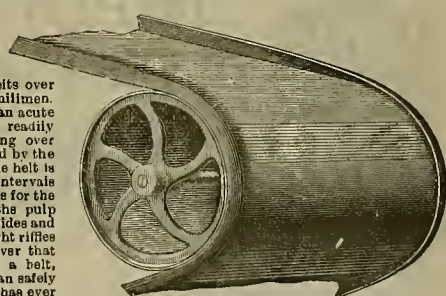
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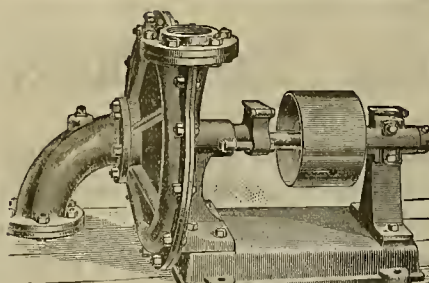
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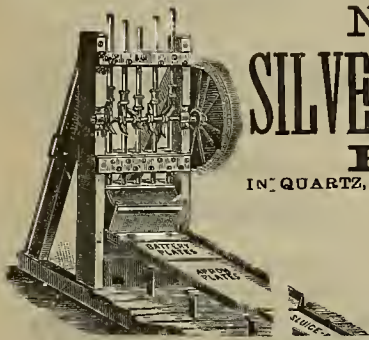
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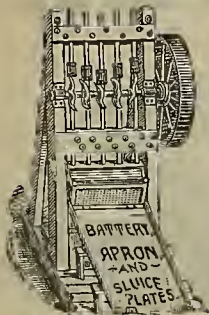
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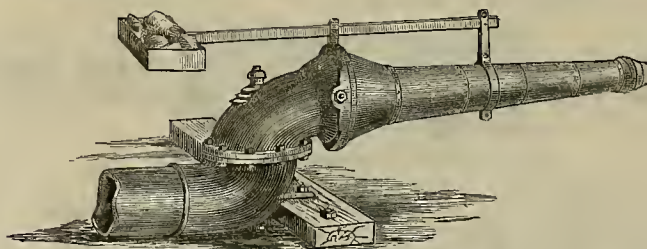
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE KEYSTONE.—Ledger, Feb. 25: The Keystone mine at Amador City is running its 40 stamps upon low-grade rock, taken from the old stopes. The company is not opening up any new ground at present, but expects to do so in the near future. Persons closely connected with the management do not know of any change in the ownership of the property, as recently reported, and assert that at the annual election, which took place in the latter part of January, the old officers were elected with the exception of the secretary, who resigned in December. It is probable that the report of the change of ownership is based on the sale of some of the stock.

THE BUNKER HILL.—Mr. Fisher, the receiver of the defunct Philadelphia Bank, who purchased the stock of the Bunker Hill at the receiver's sale, has arranged with some Eastern mining men and capitalists to lease the Bunker Hill property to them for a term of years. They were expected out here during this week to look over the property. If they find it satisfactory, the intention is to go to work immediately and carry the Mayflower shaft down and put the entire plant in operation just as soon as it is possible to get timbers and other necessary supplies.

MICELLANEOUS.—W. C. Minear investigated the condition of the water in the Volunteer shaft on Monday, and found that it was lowering rapidly. In about a week longer he expects to resume work. Mr. Minear is very anxious to get back to work, for when driven out by the water he had just struck a vein which appeared to be a portion of a valuable ledge of ore. The Gwinn mine, on the other side of the river, has been laying idle for a number of years, but at the present time a hoard on it is held by a gentleman who is in hopes of interesting Boston capitalists in opening it up once more. J. B. Francis is running a prospect tunnel into the hill on W. P. Peek's property. He is in hopes of finding a good ledge of quartz. The contractors will finish the third and 100 feet of tunnel at the Farrell mine some time next week if nothing unforeseen happens. The people at the Hardenburg are at work in the old shaft investigating its condition. The Kennedy people are still sinking in the north shaft through very hard rock.

HARDENBURG.—Amador Dispatch, Feb. 25: The proprietors of the Hardenburg mine have decided to open out the ore shaft again instead of sinking a new one, and the work of cleaning it out was commenced this morning.

Calaveras.

NORFOLK.—San Andreas Citizen, Feb. 25: F. B. Morse has just returned from the city, and it is stated, operations at the Norfolk mine will be resumed at once. The signs of the times are that this summer will be a lively period in the mining history of the camp, and in fact there never was a more general interest manifested in quartz than at present. Several minor transfers of property have taken place recently, while mine owners are promptly doing their assessment work, preparatory to the boom that is expected.

El Dorado.

MILL.—Georgetown Gazette, Feb. 25: Supt. J. W. Tryon is now making preparations to erect a ten stamp mill on the Alpha mine, located about one-half mile below the Taylor.

Nevada.

SOUTH IDAHO MINE.—Timings, Feb. 24: The South Idaho mine is the scene of active operations at the present time; several men are at work, some grading off the ground preparatory to erecting buildings, some framing immense timbers to be used in timbering the shaft, while others are cutting down the old shaft to larger dimensions and putting in timbers. The shaft is to be a three-compartment one, 5 feet by 12 feet in the clear; the timbers are spruce and 10 by 12. The company intends to timber the shaft down to the present depth and then continue to sink. The ledge in the shaft is a good-looking one, 3 feet in size, the walls being 5 feet apart. The character of the rock and the pitch of the ledge is very similar to that found in the famous Idaho. The mine is a large one, being the consolidation of two claims, each 1500 feet long, making the mine 3000 feet on the lode. In conversation with a number of experts and practical miners, we are led to believe that there is no better prospect in the State and we expect soon to hear from the South Idaho as a regular dividend payer.

FINE ROCK.—Thomas Schofield brought some very fine looking quartz to town to-day from the Reunion mine, which is situated about two miles southwest of the North Star. The claim is owned by Mr. Schofield and Mr. Wickes. A shaft has been sunk on the property and the rock shown was taken from a strigier of the main ledge. The rock was covered with free gold and the main ledge is of good size and quality.

CHAMPION DIVIDEND.—The Champion Mining Co., of Nevada City, has declared another dividend of ten cents per share. This mine is a regular dividend payer of late, and the plucky owners are getting returns from their investment after long and patient waiting.

THE GREEN MOUNTAIN.—Foothill Tidings, Feb. 24: Dan Coffin has bonded the Green Mountain mine on Osborn Hill for a company composed of Sacramento and San Francisco capitalists, who will begin operations as soon as the weather will permit. A new shaft will be sunk and the complete hoisting and pumping

outfit will be placed on the ground. The Green Mountain claim is consolidated with the Sanders' claim and the two claims have produced in all, as near as can be ascertained, \$166,664 20. The mine has never been worked systematically and the new company intends to open it up in the very best shape. It was shut down in 1864, again in 1871, in 1873, and again in 1886. Every time it has been worked it has paid well. The ledge is from six inches to three feet in thickness, and the rock has paid from \$25 to nearly \$400 per ton; all the rock that was taken out averaged \$95 per ton. This present shaft is down 110 feet, perpendicular, and drifts have been run north and south. In 1885, 12 loads of rock, crushed at the Rocky Bar mill, paid \$372.38 per load, a total of \$4,468.56. The last time the mine was worked, which was by a company of tributaries in 1886, the rock paid \$66.25 per load. This is a good showing for any mine and it is confidently expected that, with proper development and management, the Green Mountain can be made one of the best mines in the State.

THE KENTUCK.—Capt. Jno. E. Carter and company are working the Kentucky mine, which is situated a short distance northeast of the Idaho. They have been at work for the past six weeks and the prospects look very encouraging. Last night we were shown some rock taken from the ledge at a depth of about 80 feet, which showed free gold. The ledge from which this rock was taken is from six to ten inches in thickness, and over this there is two feet of cah rock. On top of this again is a ledge of low-grade ore about four feet in thickness. The cah between the two ledges will pay for crushing. This mine was last worked about seven years ago and then showed good prospects.

KEYSTONE MINE.—Grass Valley Telegraph, Feb. 25: For several weeks the old tunnel, worked years ago and running into Alta Hill from the north, has been undergoing a thorough clean-out. Just now the miners have reached the face of the tunnel and they found there the tools used long ago, just how many years we cannot say, for it is beyond the memory of most of us. The tools are at M. Callaghan's place. The drills and hammers, so oddly fashioned, are really a curiosity to the modern miner. The tunnel in the mine is now being neatly repaired and it is in the distance of 700 feet. A track is now being laid and immediately work will be driven toward the great gravel bed that surely exists close by. Messrs. Coughlin, Maiuhart and others are going to spare no pains in unearthing the great treasure hidden in that hill. The indications are that the miners are not far from the famous old channel which made men rich in the early days, and if they should find that ancient river-bed, their courage and energy will be hailed with delight and the promoters could not possibly get too much praise.

THE NATIONAL MINE.—Transcript, Feb. 23: Work is progressing on this property which is situated about three miles south of Graniteville. The mine belongs to the estate of the late D. R. McKillican. Capt. Geo. A. Nihell, manager of the estate, was in town the other evening and had with him some very fine rock taken from the National. The mine is looking better than for a long time.

GRIZZLY RIDGE MINE.—Henry Watson was over from Grizzly Ridge Tuesday and brought with him some handsome specimens taken from the Grizzly Ridge quartz mine. The pieces shown us contained lots of free gold and galena and high-grade sulphurets. The general appearance of the rock was first class. It looks very much like the quartz found in the famous Delhi mine. The Grizzly Ridge mine is situated on the ridge of that name, about three miles northwest of Columbia Hill, and about a mile from the Delhi, with which ledge it runs parallel. The owners are Peter McAusland, George Jones, Henry Watson, Fred Searls, T. B. Gray and C. J. Brand, all of this city, besides others who own more or less stock. The company has been driving a tunnel on the ledge over 130 feet, and last summer when they quit work the shoot appeared to pinch out. But recent developments show that the ledge came in again and better than before. There are now two ledges in the tunnel, one 14 inches wide, the other 6 feet wide. They came together as the tunnel has been extended and are now virtually one ledge. It was some distance beyond the junction, and in the hanging wall, that the specimens shown us were found. The rock averages well and will yield handsomely. Mr. Watson informs us that in the face of the drift there is a strip of gold 1 1/2 inches long and 1 1/2 inches wide, that can be plainly seen. He says he is saving it to show to visitors. The ledge can be traced on the surface for 1800 feet, and experts who have examined it pronounce it the mother lode of the district. Thus far a vertical depth of only 15 or 20 feet has been attained. On the dump are 50 tons of quartz taken from the ledge previous to the present strike. It will yield \$30 per ton in free gold, and the sulphurets are very rich, assaying as high as \$2300. The nearest mill is the Delhi, and the cost of sacking, packing and crushing will not warrant handling the ore in this manner. What is needed is a mill near at hand, and when this is obtained the company feels assured it will have one of the best-paying mining properties in the county. There is a splendid chance to work the mine cheaply by tunnel, while almost unlimited water-power can be procured to drive a mill and other machinery. The company is not financially prepared to erect the necessary mill and will endeavor to sell stock enough to raise the required capital. Within a radius of five miles from the Grizzly Ridge mine there are five quartz mines being worked, employing from 2 to 20 men. The prospects of the district are very flattering. The Live Oak Co. has a ledge 14 feet 6 inches wide, which will mill \$7.50 or \$8 per ton. With such a large ledge the owners would have as

good a thing as they went, if they only had a mill handy to crush their ore.

Mono.

THE BODIE CON.—Bodie Miner, Feb. 24: During the past week east crosscut, 550-foot level, was extended 7 feet. Upraise, 500 level, was extended 9 feet. Upraise from east crosscut, 300-foot level, was extended 8 feet. West crosscut, 200 foot level, Lent shaft, was extended 15 feet.

THE MONO.—During the past week west crosscut from main south drift, 550-foot level, was extended 12 feet. East crosscut from same drift was extended 18 feet. There were employed 4 miners, 1 carmen, and, jointly with Bodie, 1 engineer, 1 blacksmith, 1 watchman, 1 foreman.

CANNON-BALL MILL.—J. H. Kinkead, superintendent of the Occidental mine at Virginia, arrived Tuesday, and has been engaged in getting his cannon-ball mill in perfect working order, preparatory to making a test run on ore from the Summit. Should the run prove satisfactory, the mill will be purchased by Supt. Kelly for the Bulwer Company. This is the first mill of the kind made, and was successfully used at the Occidental. Since then Mr. Kinkead has patented another one, which he considers an improvement over his first invention.

San Diego.

SALES IN JULIAN DISTRICT.—Sentinel, Feb. 23: Four mines in the Julian district have changed ownership this month. As they were all purchased for cash by parties who are able and intend to develop them, it is not a bad beginning for the new year. As the *Sentinel* has repeatedly remarked, "all this camp needs is capital and mining brains."

Shasta.

SHIPPING ORE.—Redding Free Press, Feb. 25: Kingsbury & Hubbard, of Igo, shipped a wagon-load of rich ore to San Francisco last week. Wm. P. Miller, the mining man, has been granted a patent for recovering precious metals. We learn that George Forbes and Sidney Dale discovered an exceedingly rich quartz deposit in Rich gulch, near Churntown, this week. Captain Taylor and Fred H. Deakin, of San Francisco, were here this week. We understand that they have formed a stock company to work a mine owned by them in the Lower Springs district. They expect to put 20 men at work soon running tunnels and sinking shafts. Dan Haskell, since his return from San Jose, has been attending to his mining interests near Iron Mountain. Dan, with others, owns the Little Nellie, an extension of the Little Nellie, and has been quite encouraged by the discovery of some very rich rock in the breast of his 300-foot tunnel. He has a fine, large ledge. There is a fine specimen of ore weighing about 100 pounds at the express office, which came from the Uncle Sam mine on Squaw creek. It was sent down by Mr. James, the superintendent, and was intended for the Shasta county exhibit at the Mechanics' Fair, but came too late. It is an elegant specimen, very rich. It will probably be sent to the World's Fair. J. H. Morton informs us that the prospects are excellent in the Mammoth mine at Old Diggings. In his tunnel, over 200 feet from the surface, he has a five-foot ledge and the rock assays \$60 to the ton. Mr. Morton is developing an excellent property. The last payment for this mine was made last week by Mr. Chayney, the Philadelphia banker who represents the syndicate that made the purchase some time since.

LOWER SPRINGS MINES.—Cor. Shasta Courier, Feb. 25: Some three weeks ago mining men came up from below to investigate into the merits of the Deakin and Taylor mines. Everything looked favorable, as far as ledges were concerned, and they came up again yesterday in order to make still further examination of the whole property. They seemed to be well pleased with the situation of things in general. The amount of ore shipped during the last two years from the Taylor ledge certainly shows the best prospects of any ledge in this district. It is sufficient to warrant capital to take hold of the mine in good shape. The next best ledge upon this property is the Spanish vein, which is a strong, continuous ledge. This lode was worked quite extensively by the Potter Company many years ago. The croppings prospect very well in places. The old workings are all filled up and obstructed, so this vein is in very bad shape to entice any expenditure upon the ledge. Considerable trouble is brooding over on the Middletown side. It appears that a Dutchman is trying to hornswoggle up some of our gold-bearing ledges through an agricultural patent, the same as has been done here in many cases. I supposed all of the red-soil grabbers had gone in their holes and pulled the holes in after them, but such is not the case. The miners ought to arouse themselves to action, fall into rank, and file a protest against such an evil. If the miners would talk less and do that which they ought to, they could certainly wipe out this fraudulent way of obtaining mineral land by claiming it to be agricultural land. A large number of our best quartz ledges here in this district have been captured by patents covering 160-acre tracts. The area of mining ground for prospectors is getting quite limited, and steps should be taken to secure from railroads and other corporations that which is left.

FINE ORE.—Shasta Courier, Feb. 25: Last week the Schroter boys set the water-power pump going and cleaned out the shafts on the Schroter or old Ned Reese mine near the hospital, about a mile north of Shasta, and this week they struck some fine ore. Grant and Arthur Schroter and Lew Stark are working on the mine and taking out ore. They have a cannon-ball water-power mill at the mine, but they expect to ship the rich rock. We understand that Deakin & Taylor have

bonded, or made arrangements to bond, their mines at lower Springs, near Shasta, to San Francisco parties, and that work will be commenced on the property soon on a big scale. The property is a good one and will justify development. A good many Chinese are working in the placer diggings along Clear creek. One company of about 15 are working at Horse-town and taking out considerable dust, but how much no white man "sarveys," for the Chinese are rather uncommunicative on this subject. We hear it rumored that the old Buuker Hill mine, between Shasta and Middle Creek, will change hands in a short time. The mine was lately bonded from the old owners by Wm. Murray and S. Hull of Shasta, and negotiations have been pending for some time for a transfer of the mine to a combination of capitalists. Bunker Hill was one of the bonanzas of Northern California in the '60 period, but litigation kept the mine tied up many years. There is no doubt but that active development would reveal gold deposits as rich, or richer, as any found in early days, and since Murray & Hull bonded the property they have discovered some flattering prospects. If the proposed deal is effected, the new company will put up a mill on Middle Creek and work the mine on an extensive scale. We understand that some Colorado mining men will be here in a short time to examine the property. Joe Woll, of Shasta, has a contract with the Dog Gulch Co. to run a tunnel on one of their locations on Clear creek, about five miles west of Shasta, and is getting some good prospects. The Dog Gulch property consists of some 13 different claims, including the old Strond ledge, and is owned by a Colorado mining man, N. N. Brown, who is at present in Europe, hence little is being done on it at present. We understand that Supt. Cammon is expected out here soon, and that substantial developments will be made on the property in the near future. Alfred Hargrave found a chunk of quartz weighing one pound in the old Drummond mine, on Spring creek, a few days ago, which, when pounded in a mortar, yielded \$54.50 in gold. The final payment on the Mammoth mine at Old Diggings, sold some years ago by Garrecht, Young, Panter, Hop-ping, Bell and others of Shasta and Redding to an Eastern company, was made a few days ago and the purchase of the mine closed. The Mammoth is one of the best mining properties in the county, and the company will make things hum there in a short time. Mc-Timmons & Sonnerhouse have had a force of half a dozen men at work on the Gypsy mine at Lower Springs. The ledge, at a depth of less than 40 feet, is three feet wide and promises to develop into one of the best mines in this vicinity. Work is still being pushed on the hidden Treasure, at Iron Mountain, and a small force is working at the Little Nellie. Frost and his partner Snow, who took out about \$2500 near the old Cannon House a short time ago, are still obtaining good returns from their claim. Frost recently came from Siskiyou, and sold a half-interest in the mine to his present partner for \$30 just before making the big strike.

Sierra.

AT SIERRA CITY.—Mt. Messenger, Feb. 25: Mr. Gray and Mr. T. Burke, two experts from Redding, were here looking at the Phoenix mine and property recently. They took back with them photos of the mine, also samples of the rock to test. The Buttes and Phoenix mills have started to work again. They have been closed owing to the recent storms having blocked the ditches. John Mansfield, while working on the Buttes flume, froze his hands and feet.

YOUNG AMERICA.—A tunnel is being run at the Young America mine, with a view to tap a ledge that was very rich in the upper levels, but which pinched out. Those best posted are confident that the ledge will come in again farther along.

WIDA AWAKE.—About 24 men are employed at the Wida Awake drift mine. This claim is doing well we understand.

Siskiyou.

TUNNEL.—Yreka Journal, Feb. 25: J. M. Lut-trel, who has charge of the Pacific Coast Mining Co.'s claims at Indian creek, owned principally by the well-known steamship firm of Goodall, Perkins & Co., and himself, has run a tunnel about 500 feet in length, to tap one of the three ledges, and expects to reach the ledge in a few more feet. He has considerable trouble with water, requiring the use of canvas roofing to shed the water. The ledge prospects rich at the surface and will no doubt yield handsomely when stoping is commenced in the tunnel. Lee, Lash & Co., of the Greenhorn blue gravel mine, intend forming a reorganization of their company for working their mine on a more extensive scale, now that it is certain of proving a profitable paying property. They have been doing a vast amount of work in opening the claim with but limited means, and need capital to carry on the work successfully. We hope they will succeed in their undertaking, as the thorough opening of the rich gravel bed on Greenhorn will undoubtedly be the means of realizing a great yield of gold, as the blue gravel taken out has all shown very rich prospects.

Trinity.

TAYLOR'S FLAT.—Cor. Trinity Journal, Feb. 25: The Tunnel and Mining Company are at present repairing their ditch and flume, the stormy weather having done quite an amount of damage to it. They have worked off about 24 acres of ground, and there have been taken out about 400 pounds of gold from it. Mr. C. L. Griffith, who has charge of the mine, when the water failed had several prospect drifts run in the ground, and found large prospects in all of them. We are looking for him up at any time to commence work after the ditch is repaired. All the miners are at work, as water is plenty.

We have a boom in embryo here. When it will blossom out I cannot say. Some of the boys went up French creek last fall; they found good prospects in gold that carried quartz, but no quartz that carried gold. There are four distinct belts of rock with the contacts well defined; the main belt that forms the dividing ridge being a hard steel-blue rock, next a serpentine belt, next a soft porphyry, then a slate and last, on the north side, what we miners call granite. Some quartz has been found, but in bunches or pockets only—no regular ledges. They got a good gold prospect, one piece weighing \$3.50. The gold was all coarse and very rough, except the larger pieces, which were somewhat smooth; but it was all what miners would call quartz gold, even this largest piece having some quartz attached to it. The boys have made a fine pack trail up to within four miles of the head of the stream, and next summer they will try to find out whether it will be a boom or a fizzle.

THE TRINITY RIVER MINES.—Cor. Trinity Journal, Feb. 25: Nearly all the mining going on in the vicinity of Cox's Bar is done by Chinamen. At Hall's flat, one mile above Cox's Bar, is the Tom B. Price mine. Mr. Price spent 12 years in running a drift 600 feet long in the upper part of the claim. While running the drift he had to haul timbers for a mile and a half. This claim is now leased by the Ah Get & Ah Tow Company. There were 11 men working, and they were working hard at the lower end of the claim, where they had a giant with a six-inch nozzle. The ditch is a mile and a half long, bringing the water from Sawmill creek to the claim with a pressure of 70 feet. There are two lines of sluices, 12 and 20 boxes long. There are many very heavy boulders, and the Chinamen are compelled to do a great deal of blasting, 25 pounds per day being the average. One of the most intelligent of them told me that the powder for the season's work would cost \$800. The bank is about 40 feet high at this point, and the Chinamen are working at a great disadvantage, owing to the poor dump for the debris. They seem, however, to believe the claim to be rich. According to all reports, it has been rich in the past, and, as they are opening up new ground, it may prove to be as good as ever. The Keeley claim at Manzanita flat, opposite Tinsley's, is leased to a company of Chinamen, of whom there are ten working it by drifting. This is said to have been very rich ground. At Cox's Bar, a mile below Tinsley's, there are a number of Chinamen cleaning bedrock, and perhaps a half a mile below them is the claim belonging to W. A. Pattison; but, as a heavy storm was in progress at the time of my stay there, no work was being done and I did not visit the claim. I propose to do so on my return up the river. A half mile below Pattison's there is a suspension bridge, holding the pipe which supplies the water for the claim at Vance's Bar, now being worked by Geo. W. Tinsley, Geo. E. Harrington and Joseph W. Gore. We saw some of the dirt panned out, and it was very rich. We propose to visit this claim again on our return up the river.

Tuolumne.

ENCOURAGING REPORTS.—Sonora Democrat, Feb. 25: Reports from the mining district of Rawhide are encouraging. About 40 men are employed, and the ore is looking well. Lonis Page is working away on his pocket mine on Brown's Flat. He says the prospects are encouraging, and that good results will be realized. The Jo Hooker mine, situated 2½ miles above Soulsville, is looking encouraging. The vein increases in size as depth is attained. The ore shows free gold. Two hundred pounds of it was shipped to San Francisco this week for assay. W. C. Oakes, the progressive and persevering miner, is going to considerable expense in opening up an old mine on Brown's Flat. The property in former years was known as the Fox & Elliott claim, and is said to have been fabulously rich. The Dutch mine at Quartz Mountain is showing up some high-grade ore. In this locality is the Golden Rule mine, in which a body of rich ore has been struck. Seven men are employed in this mine, merely doing development work. If the recent rich strike is to the extent we have been informed, it is more than likely that proper facilities for working ore will be erected on the property. A rich vein of ore has been developed in a mine owned by Messrs. Ryan, Gloster & Cook, which is situated on Spring gulch, between the New Albany and Buchanan mines. The property is bonded to A. W. Moulton of Oakdale, and that gentleman has had a force of men working for several months, opening up the vein, which is from five to eight feet in thickness and very rich in free gold.

Yuba.

PREPARING TO HYDRAULIC AT SMARTSVILLE. Marysville Appeal, Feb. 25: Several persons who have recently visited at Smartsville informed an Appeal reporter that the Excelsior Water and Mining Company is making preparations to commence hydraulic mining as soon as the Camentti bill becomes a law. The pipes are being laid down and a dam will be soon erected to control the tailings. The old dumps will be cleaned out and a large number of men will be put to work soon. The State Anti-Debris Association will probably have the works inspected as soon as they are complete.

NEVADA.

Ferguson District.

THE LADDER IMPROVING.—Pioche Record, Feb. 25: The ledge cut recently in the Monitor tunnel of the April Fool group of claims, Ferguson district, improves with every foot driven on it. It now averages over eight feet in thickness, and assays from it show it to run \$50 a ton and upward in gold. This in itself becomes at once a wonderful property, leaving the April Fool claim aside entirely. This estimate of assay value is corroborated by non-interested parties who secured samples

from the face of the ledge. On account of the remoteness from any general reduction plant, however, the ore is not to be shipped. The owners are conferring with Denver parties, who offer to furnish reduction works most suitable for the ore if the claim-owners will but ship them a sufficient quantity to Denver for reduction to enable them to determine the best works to supply, and to take their pay for the works in a royalty of so much a ton on ore worked. This the boys think favorable of doing, and a few months hence may witness a reduction plant in active operation at the April Fool mine.

Pioche District.

ARBORENTIFEROUS GALENA.—Pioche Record, Feb. 25: Messrs. Schofield, Spillman and Flynn have struck a fine body of galena ore, assaying from 150 to 184 ounces in silver and 60 per cent lead, in the "Old Timer" tunnel, one of their claims, three miles west of town. The mineral has every appearance of holding out, and if it does it will be one of the finest discoveries made in this county for years past. The Polaris Mining Co. has finished the erection of its steel whim over an 80-foot shaft lying southeast of its present whim shaft on the Poorman mine, and has already sent the new shaft down some 30 feet. It expects to cut the Poorman ledge at about 140 feet from the surface. W. S. Godhe has sold to Jesse Orwin and others, of Beaver, Utah, material for a 10 stamp quartz mill which is to be erected at the gold claims recently discovered some ten miles north of Beaver. The millstuffs disposed of goes from the Dry Valley and the Bristol properties. S. T. Godhe has been expected here for some time with new parties interested in the Pioche Co. property. It is now reported that he will not come before the first of the month and possibly later. He wrote a friend here recently that he hoped his visit would result in some work going on with the property, and that, too, in a short time.

Robinson District.

THE JOANNAH MINE.—White Pine News, Feb. 25: Everybody says the Joanna has been sold and the first payment made. This is probably true, though we are not in a position to speak by the card. In any event, there is no need of our people getting unduly excited over the matter, as it will be some time yet before active work will commence.

MONTANA.

AROUND BUTTE.—Inter-Mountain: There is nothing of importance to chronicle in the mining industry in this district this week. The large silver mills of the district, with the exception of the old Alice mill and the Blue Bird, are dropping their stamps as usual. Speculation is still rife as to the probable date of resumption of the Anaconda and syndicate properties. Everything is in readiness to resume the moment the signal is received, and it is believed that this will not be long delayed. The mines of the Boston & Montana Co. were worked with a reduced force during the week, and the number of unemployed men around the city was considerably augmented in consequence; but during the latter part of the week all the men were placed to work again, and ore for the Great Falls smelter is being produced with its old-time regularity. The Butte & Boston Co.'s works and mines are all in operation. The Silver Bow mill is in operation and is treating ore purchased from leasers, and is also working a quantity of the oxidized ore from shaft No. 2. Silver Bow shafts Nos. 1 and 2 are the chief sources of supply for the company's smelter. At shaft No. 2, which contains a quantity of oxidized ore, work is steadily progressing. While silver was quoted at a fair figure much of this oxidized ore was worked, but since the decline in the price of the white metal, it is only where large quantities of this ore can be easily mined that the work of mining and treating it will pay. On the east Grey Rock, one of the properties of the above company, is located one of the largest engines of the district. This mine is in steady operation. It is said that the Colorado smelter is not producing the same quality or quantity of matte as in former times. Most of the ore for the smelter is obtained from the Gagnon, which, in its early days, was considered a silver mine, but now the property ranks as one of the great copper mines of the district. Occasionally rich bunches of silver ore are encountered in its workings. The other mines of the company are the Philadelphia and Nettie. Operations are not very lively on the two last-named properties at present. Considerable ore is purchased from leasers by the Colorado smelter. The Butte Reduction Works has not employed its customary force of men during the past winter. The concentrator attached to the works has been idle the greater portion of the time. The chief source of supply for these works are the Colusa-Parrot, Original, Travonia and some other small properties. All the ore at the works is now desulphurized in kilns and the old roast-heaps through which pedestrians had to wade in the old days have been entirely removed. The Parrot smelter obtains its supply of ore from the Parrot and Moscow mines and from D. G. Bricker's lease on the Virginians. It is rumored that the Parrot Company expressed dissatisfaction at the recent smoke agitation, and that some of the stockholders had stated that if the company was required to build a stack as suggested by the citizens of Butte, the smelter would be moved elsewhere. The north lead of the Parrot mine becomes more valuable as depth is attained. But few men at present are employed in leasing. The favored locality for this persevering class is along Missoula gulch and the water-sheds running into it. Some of the promising Walkerville properties are the Goldsmith, upon which considerable work is being done, and the Amy & Silversmith, Bonanza, Boston and Pollock. The Mountain View shaft has attained a depth of 1000 feet, and most of the

work of development is confined to the bottom level. This mine has ore enough in sight to last for a number of years. One advantage possessed by the Mountain View is that, being situated so close to the Anaconda properties, the latter properties drain it. The pumps at the Mountain View are only operated about two hours each day. The mine is all at work again on this property.

NEW MEXICO.

A BRIGHT OUTLOOK.—Southwest Sentinel: The mining outlook for this section is considerably brighter now than it was a few months ago. Assurances come from the Mogollons that the season there will be one of great activity. The Colonial Co., operating the Maud S. mine and mill, is now one of the largest producers of bullion in the Territory, and the Confidence Co. will soon have a mammoth mill in operation on ore from the Confidence group of mines. There is a prospect that the Last Chance property will be worked profitably, and work has been commenced on other mines in the camp. Until last year the mines in that camp had been worked at a disadvantage, on account of insufficient facilities for treating the ore in the camp. The distance to railroad transportation is so great that it does not pay to ship any but the highest grade ore to outside points for treatment. The mills of the Last Chance and Colonial Co. were completed last year, and the Confidence Co. will probably have the largest mill in the Territory completed there this year. The outlook at Pinos Altos is very encouraging. The Manhattan Gold M. and M. Co.'s tunnel is nearing completion, and when it is completed the company will commence to take out ore for the mill here. On completion of the tunnel the company will be able to mine ore considerably cheaper than it has been mined by the company heretofore, and it is expected that the mines can be operated as successfully as the Pacific Gold Co.'s mine which is on the same lead and is now producing ore enough to keep two mills in operation. The output of the Mountain Key, Bell and Stephens' mines and other properties in the district is expected to be considerably more than last year, and the new strike made near the Silver Cell is expected to become a good producer. Some good ore is being taken out at Black Hawk, and there is considerable development going on there which may result in opening up large bodies of ore. This district always produces rich ore, and development work never fails to open new bodies of ore in any of the mines. Dimmick, Laizure & Fronger have their shaft down 25 feet on the Grey Eagle mine and the vein is steadily growing wider. They will take out ore enough for a mill-run, when it will be tested. The ore looks well and will probably run high. If the project of getting cheap coal at Hanover is carried out, that camp will be the liveliest in the Territory before the end of the year. There is practically no limit to the ore in the district and the immediate vicinity, and with reduction works there there would be room for thousands of miners and laborers. All the ore produced is of a smelting character, and with cheap coal a larger smelting plant could be kept in operation than there is now in New Mexico. The future of this camp depends entirely upon the fuel question. If coal can be brought from the fields near Gallup and delivered at Hanover at as low a rate as it can be delivered from the mines in the northern part of the Territory to the Socorro smelter, there is no reason why large smelters could not be operated at Hanover, and it is not improbable that iron works and rolling mills will be put into operation. The outlook for lead camps in this county is not so good as it was some months since, on account of the low price of lead; but it is not believed that this materially curtails the production. The repairs on the custom mill at Gold Hill are about completed and the mill will be started up on custom ores in a few days.

OREGON.

THE VIRTUE MINING CO.—Bedrock Democrat: The explorations and developments made since the Virtue Mining Co. came into possession of the Virtue mine, in the operation of which the Virtue Mining, Milling and Development Co. made such a dismal failure, much to the disappointment and loss of many of the business people of this community, are such as to fully warrant the belief that the stockholders in the new company have a bonanza. Since taking charge of the mine, Mr. N. S. Wight, manager, has had a force of miners at work in the upper level above water, awaiting the arrival of a new pump to clear the lower workings of water. In the upper level a good, strong ledge is exposed fully three feet in width and wonderfully rich in gold, samples of which show free gold in large quantities. From this ledge about 125 tons of ore have been taken out and are now in the bins at the mill awaiting reduction, and it is expected that the 10-stamp mill will be started crushing this week. Mr. Wight and Mr. Borman came in from the mine on Sunday evening, bringing with them quite a large quantity of ore which they broke from the face of the ledge before leaving the mine. The ore contains a large quantity of sulphurets, predominating, however, in free gold, an assay of which would probably give a value of \$20,000 to the ton. Yesterday the expected Cornish pump arrived from the East and will be taken at once to the mine and put in place for clearing the lower levels of water. This will be accomplished in 30 days after the pump starts and then an additional force of miners will be engaged in taking out ore from the ledges said to exist and from which there is already about 250 tons of ore in the drifts, mined by the former company, and which was not taken out on account of the breaking of the old pump and subsequent filling up of the mine with water. If properly managed, it now seems that the Virtue Mining Co. has unusually bright prospects, and its success is assured.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 21, 1893.

- 492,257.—COOKING APPARATUS—J. S. & C. E. Baker, Newburg, Or.
492,259.—LEMON-SQUEEZER—C. W. Barrett, Lemoore, Cal.
492,265.—CONDUIT ELECTRIC RAILWAY—F. W. Brann, Oakland, Cal.
492,324.—RAILROAD FOR CARTADOES—Chambers & Gruber, Bitter Water, Cal.
491,896.—PINCH BAR—Combs & Frates, Ione, Cal.
492,284.—EXTENSION TABLE—Graff & Harbaugh, Portland, Or.
492,331.—ROPA SHEAVE OR WHEEL—J. W. Kerr, S. F.
492,034.—CAN-SOLDEARING MACHINE—A. W. Livinston, S. F.
492,040.—RECOVERING PARCIONS METALS—W. P. Miller, Redding, Cal.
492,241.—BAIDLA BIT—Sears & Lindsey, Spokane, Wash.
492,056.—PRODUCING DENTAL CEMENT—M. Sichel, S. F.
492,244.—ARMATURE CORES FOR ELECTRIC MOTORS—A. W. Smith, S. F.
492,247.—FOOT-WEARMER—W. E. Ulmer, Honolua, Wash.
492,251.—BRICK KILN—P. L. Youngren, Oakland, Cal.

The following brief list by telegraph, for Feb. 23, will appear more complete on receipt of mail advices:

San Francisco—Clarence W. Bailey, swing joint; Thomas Doyle, rope thread; J. H. Coffran, L. Hill, apparatus for controlling pumps; Adolph Schullenberg, ore-crushing mortar; Charles F. A. Sturis, electric burglar alarm; Edwin H. Thomson, apparatus for reducing bituminous rock. California—Samuel H. Bass, Oakland, window frame and shaft; Daniel E. Donegan, Los Angeles, dumping wagon; John Frey, West Berkeley, separator; E. Vander J. Gillespie, San Jose, roll paper holder and cutter; William C. Gilmer, Stockton, combination tool. Oregon—Otto Van Costram, Portland, waterproof suit. Washington—John McKinnon, Colfax, clothes dryer. Arizona—Michael J. Fitzgerald, Aravaipa, tire-tightener.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LEMON-SQUEEZER.—Chas. W. Barrett, Lemoore, Tulare Co. No. 492,259. Dated Feb. 21, 1893. This is one of that class of lemon-squeezers in which a vertically-moving plunger operates within a cup containing a strainer upon which the lemon rests, said cup being provided with a discharge aperture adapted to convey the juice into an underlying tumbler. The invention consists essentially in an open-front cup provided with a vertically-swinging front plate adapted to open and close the cup, said swinging plate carrying the strainer which is moved into and out of the cup by the swinging of said plate. The object is to provide a simple and easily-handled lemon-squeezer, the peculiar advantage of which is, that by a simple and rapid movement the lemon may be inserted to be squeezed and may be discharged after the plunger has compressed it.

BRICK KILN.—Peter L. Youngren, Oakland. No. 492,251. Dated Feb. 21, 1893. This is one of that class of kilns for burning bricks and other wares in which suitable damper-controlled passages and flues are provided to effect the course of the fire and draft in either direction and its ready reversal. The objects of the invention are to provide for the reversal of the fire and draft in a simple and effective manner and to admit hot air into the kiln chamber in such relation to the burning gases as to promote and complete combustion.

CONDUIT ELECTRIC RAILWAY.—Fred W. Brann, Oakland. No. 492,265. Dated Feb. 21, 1893. The object of this invention is to provide for a more perfect protection and insulation of the conductor which carries the electric current within the underground conduit, a means for producing a thoroughly-insulated connection between the trolley which travels in contact with the conductor and the rheostat and intermediate connection with the motor, with means for preventing the grounding of short-circuiting of the current, and mechanical contrivances whereby a more perfect operation of the apparatus is insured.

HORSE-DETACHING.—George Riley, Vallejo. No. 491,815. Dated Feb. 14, 1893. This invention relates to a novel device for disengaging animals from vehicles which they are handling in order to prevent accident occurring by reason of the animals becoming frightened or running away.

PAOSPACKING.—The hills below the snow-line are alive with prospectors, who, with pick, pan and rockers, are making grub money, and not a few are rocking out big wages. Last week a couple of prospectors made a rich discovery of gold quartz on Canyon gulch, about a mile above the pest-house. They have already taken out several hundred dollars' worth of gold, and the prospect still continues to yield hand-mortal rock. They think they have a bonanza in sight.

Market Reports.

The Markets.

SAN FRANCISCO, March 2, 1893.

Fine Silver Values.

Fine silver was pretty steady last month, both in London and New York. On the 1st of February the price was 38 1/4 for 925 fine in London, and 83 1/4 for 1000 fine in New York. The highest price for the month was reached on the 17th, when the rates were 38 1/2 in the former market and 84 1/4 in the latter. At the close of the month the rates were 38 1/4 and 83 1/4 respectively. The extremes in both markets for the first two months of the year were as follows:

	London—	New York—
	High. Low.	High. Low.
January.....	38 1/4-16d 38 1/4-16d	84c 83 1/4c
February.....	38 1/4-16d 38 1/4-16d	84 1/4c 83 1/4c

In February, 1892, the extremes in London were 41 1/4-16d to 41 1/4-16d, and for the first two months of that year, 43 1/4-16d to 41 1/4-16d.

Coal Receipts at San Francisco.

The receipts of coal at San Francisco by water, exclusive of the product of Mt. Diablo mines, for February, and for the first two months of the year, compare as follows:

	For	Jan. 1 to
	February.	Feb. 28.
Puget Sound, tons.....	24,082	62,279
Oregon.....	2,600	6,400
Australia.....	400	2,500
British Columbia.....	1,184	15,589
English.....	32,861	80,398
Scotch.....	8,905	17,853
Welsh.....	5,663	5,663
Wales.....	2,142	9,415
Total.....	84,837	200,197
In 1892.....	107,840	245,997

The receipts from Australia and Europe continue light. There were only six cargoes from Australia in the past two months of the year, and about the same number from all ports in Europe.

Coinage of the San Francisco Mint.

The local mint turned out \$2,640,000 in double eagles last month, against \$2,460,000 for the same month last year, of which \$2,200,000 was in double eagles and the remainder in silver coins.

For the first eight months of the fiscal year the coinage compares as follows:

	1891.	1892.
Double eagles.....	\$16,182,500	\$15,500,000
Half eagles.....	412,500	412,500
Standard dollars.....	470,000	700,000
Half dollars.....	160,000	198,720
Quarter dollars.....	604,020	119,000
Dimes.....	326,000	22,901
Totals.....	\$17,742,520	\$16,953,121

Eastern Silver Markets.

NEW YORK, March 2.—Following are the closing prices for the week:

	Silver	Silver
	in	in
London, N. Y. Copper. Lead. Tin.		
Thursday.....	38 1/4	31 1/2
Friday.....	38 1/4	31 1/2
Saturday.....	38 1/4	31 1/2
Sunday.....	38 1/4	31 1/2
Monday.....	38 1/4	31 1/2
Tuesday.....	38 1/4	31 1/2
Wednesday.....	38 1/4	31 1/2

San Francisco Metal and Coal Market.

Per Ton.....	English, D.....	STEEL.
BORAX.....	14	18
Refined, in car lots.....	7 1/2	15
Powdered, do.....	7 1/2	15
Concentrated, do.....	7 1/2	15
All grades jobbing at advance, do.....	7 1/2	15

Per Ton.....	English, D.....	TINPLATE.
Bolt.....	22	22
Sheeting.....	22	22
Ingot, jobbing.....	14 1/2	5 8 1/2
Do, wholesale.....	13 1/2	5 8 1/2
Fire Box Sheet.....	22	22

Per Ton.....	Spot.....	COAL.
Bar, base.....	3	24
Norway, base.....	4	24

Per Ton.....	Spot.....	SPOT FROM YARD—PER TON.
Epilston.....	20	50
Glenbrook.....	21	50
Am. Soft, No. 1.....	22	50
Oregon Pig.....	22	50
Puget Sound.....	22	50
Olay Lane White.....	22	50
Langdon.....	22	50
Thorndike.....	22	50
Gardner.....	22	50
Barrow.....	22	50
Oregonian.....	22	50
CHROME IRON ORE.....	22	50
Per ton.....	00	00

Per Ton.....	Spot.....	COKE.
Fig.....	4	50
Bar.....	4	50
Sheet.....	4	50
Pipe.....	4	50

Drop, sizes smaller than	English, to load.....	COKE.
B, 1/4 of 25 lbs.....	10	50
Do, 1/2 of 25 lbs.....	10	50
Do, 3/4 of 25 lbs.....	10	50
Do, 1 of 25 lbs.....	10	50
Do, 1 1/2 of 25 lbs.....	10	50
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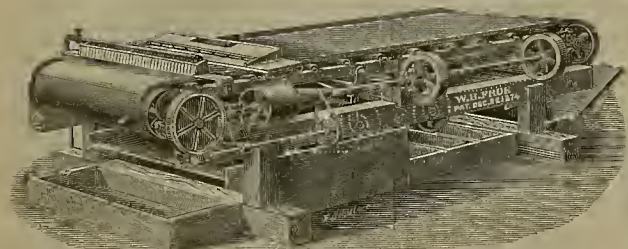
Drop, sizes smaller than	English, to load.....	COKE.
B, 1/4 of 25 lbs.....	10	50
Do, 1/2 of 25 lbs.....	10	50
Do, 3/4 of 25 lbs.....	10	50
Do, 1 of 25 lbs.....	10	50
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Do, 5 of 25 lbs.....	10	50
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Do, 98 of 25 lbs.....	10	50
Do, 99 of 25 lbs.....	10	50
Do, 100 of 25 lbs.....	10	50

Drop, sizes smaller than		Lehigh Lump.....11	00@- -
B, 1/4 of 25 lbs.....	\$1 80	Cumberland.....12	00@- -
Do do, B and larger sizes		Egg, hard.....10	00@- -
3/4 bag of 25 lbs.....	2 00	West Hartley.....7	50@- -
Buck, Balls and Chilled		COKE.	
		English, to load.....\$9	50@10 00

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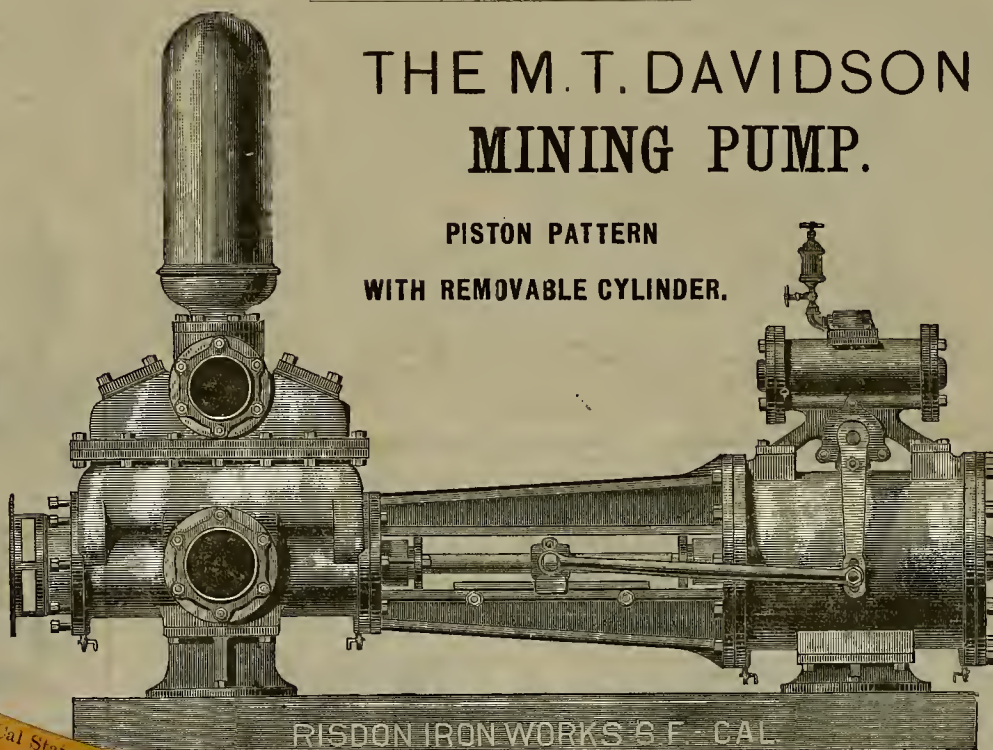
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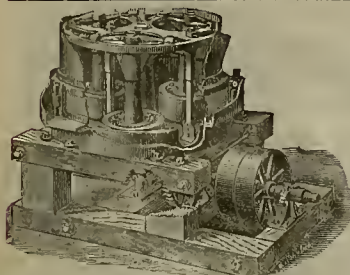
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VOL. LXVI. — Number 10.
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SAN FRANCISCO, SATURDAY, MARCH 11, 1893.

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Mining Bureau Appropriation.

In the general appropriation bill, recommended by the Ways and Means Committee at Sacramento, the sum of \$50,000 is set aside for the State Mining Bureau, the same amount which was given two years ago. It is provided that 60 per cent of this sum is to be spent in geological field-work and scientific research. This appropriation gives the Bureau \$25,000 a year for the two years, and is about the amount required for the work. Too large a proportion, however, is allotted to "geological field-work and scientific research." This is about the time for a more systematic arrangement of the data already on hand, which would really be office, not field work. We mean by this that the Bureau should classify, catalogue and index the contents of its museum, library, reports, etc., in such a manner that the information therein could be easily obtained by those in search of it. In other words, the Mining Bureau should be more of a Bureau of Information than it is at present. When a miner wants to know all about any branch of the mining industry or any minerals, the information about that branch or mineral should be segregated in such a way as to be accessible to him. Under present circumstances, the data is scattered through innumerable volumes and reports, and is not available without considerable research. Ordinary miners unfamiliar with such matters cannot get at what they want. Some specially skilled assistants should be set at this task by the State Mineralogist, and all the information in possession of the Bureau be properly arranged for immediate service. In this way the institution could be made more practically useful to the mining community. Fault has been found that the reports repeat themselves too much; yet the appropriation bills are so worded that the ground must be gone over and over, and little is left to the judgment of the Mineralogist or the trustees. The object of the field work provision is plainly to keep a lot of useless political clerks out of the San Francisco office.

Bureau was not in any way represented in the lobby at Sacramento this year and no promises of patronage were required or made. The new Mineralogist, Mr. Crawford,

It was not necessary in this instance, however, as the

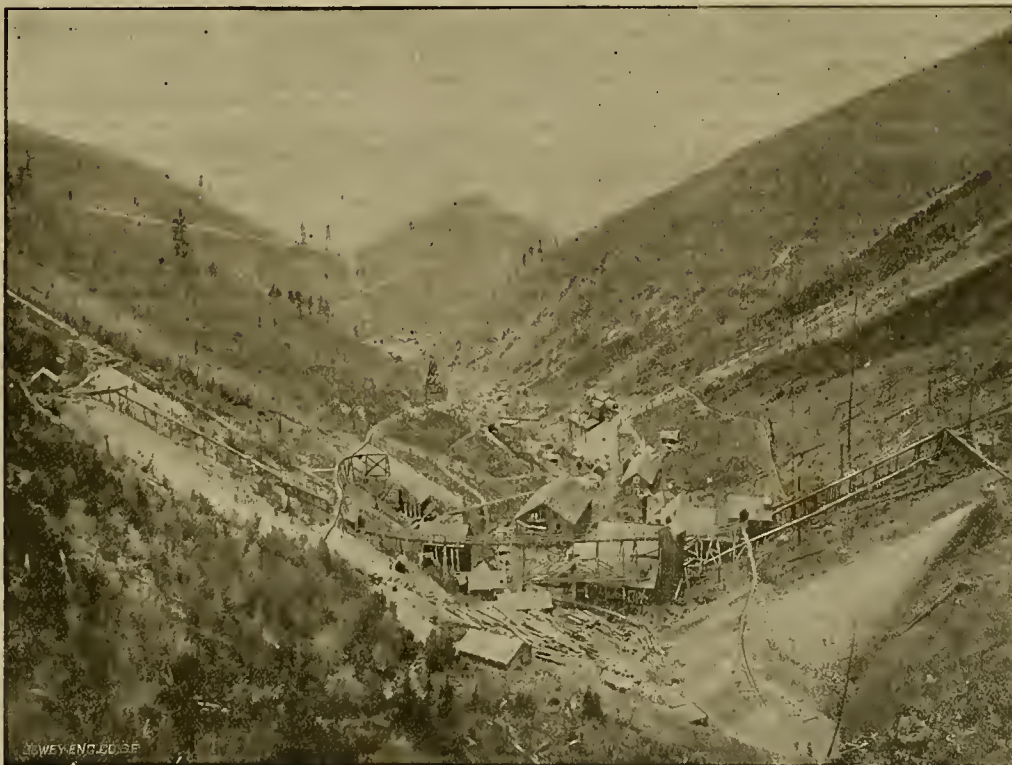
appears anxious to make a good record for the Bureau and for himself, and will doubtless take an active personal part in the work.

An Idaho Mining Camp.

Wardner, Idaho, is one of the mining camps of the Cœur d'Alene region, made famous not only for the labor troubles which occurred there, but for its rich mines and large product of silver and lead. One of the engravings on this page shows a view of the town, looking up toward the Bunker Hill and Sullivan mines, and the other is a view of that part of the canyon where the mines and part of the works are situated. Interest is centered in this camp just now, owing to the fact that the principal mines closed down this month, throwing a large number of men out of work. The reasons for this action are given fully in another column of the PRESS. The high trestles shown in the engraving are the supports for the wire-rope tramway of the Bunker Hill and Sullivan mines. The buildings at the mine have somewhat changed since the photograph was taken, but the views will give a good idea of the general location of the camp and mines.



THE MINING CAMP OF WARDNER, CŒUR D'ALENE, IDAHO.



BUNKER HILL AND SULLIVAN MINES, CŒUR D'ALENE, IDAHO.

JOHANNESBURG, 1200 miles north of Cape Town, South Africa, which did not exist six years ago, now has a population of 50,000. It is the new gold-mining region which is about 80 miles long and 3 miles wide. The gold yield is now from 130,000 to 150,000 ounces a month, exceeding the total of that of the whole of California. The mines are all owned by European capitalists—mainly Englishmen.

A GOOD MANY old mining men will be glad to know that at the last meeting of the Society of California Pioneers a resolution was adopted permitting all members who have paid \$100 in dues to become life members. Those not having paid that amount will be allowed the same privilege upon payment of the balance necessary to make up the \$100.

OPERATIONS at the Ward shaft, on the Comstock, were suspended on Tuesday, throwing about 15 men out of employment. The Ward shaft was operated jointly by the Bullion, Chollar, Potosi, Alpha and Exchequer mining companies, and through it the 1800-foot levels of those mines were being explored.

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San Francisco, March 11, 1893.

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Comment.

The legislature provides in its appropriation bill for the sum of \$288,000 to be expended in the direction of agriculture and allied industries. To the Board of Horticulture it gives \$29,000; Board of Viticulture, \$30,000; State Agricultural Society, \$40,000; district agricultural societies, \$179,000, and citrus fairs, \$10,000. In the direction of mining the State gives \$50,000 for the support of the State Mining Bureau. There is no special objection to the relative proportions, though at one time it was proposed to cut the Mining Bureau appropriation down to \$20,000. The Ways and Means Committee, however, saw the error of its way and let go of \$50,000 of its means. It is to be hoped that the legislature will hold to the recommendation of the committee, and this will probably be the case.

The Stock Board mining companies cannot tell in these times how much money they will get from an assessment until the delinquent sale is over. People are apt to drop the stock and let it be sold when an assessment catches them. Prices have fallen so low on an average that a 25 or 50-cent assessment is too much to pay. It is unfortunate that such a state of affairs exists, but those who have been managing the market are themselves to blame. Time was when it was no trouble to collect assessments, but that time has passed.

There are many unemployed people in this city at present, and their complaints are beginning to be heard. Meantime, money is piling up in the savings banks, and savings banks are increasing in number. Those with money seem disinclined to make original investments, so that trade and manufacture languish. There is an abundance of money, but it is not circulated. This lack of enterprise is greatly to be deplored. There is a heaven needed here of Chicago or Denver men to show our monied people what enterprise will do. With \$100,000,000 lying in the banks and drawing only about 4 per cent interest, business is dull; but if it were more freely invested in enterprises, there would be better times in San Francisco.

Some of the Comstock bonanza men have been trying to get hold of gold properties in Nevada county in this State and failed. The claims were held at too high a figure. We venture to state that if the same figures for equal prospects had been asked for properties a thousand miles or so away, there would have been no demur; but gold properties within a few hours' ride of San Francisco are not so much sought for. They will be, however, in due time. Already there is more demand for gold mines than there has been for years. With silver, lead and copper low in price, the gold mine is king. There are

more of them here than in any State in the Union. Times have been dull in California mining regions for many years. Now that there is a revival in prospect, mines cannot be bought so cheaply as might have been the case a few years since.

The city sewer engineers are about to study the course of the currents in this bay at ebb and flood tide, so as to arrange about great sewer outlets. Instead of doing this, it would seem more to the purpose to visit the office of U. S. Engineer Mendell and see his current maps. All this work has already been done very thoroughly by the Government engineers in connection with the matter of torpedo defense. Moreover, they have not only speed and direction of surface, but of subsurface currents. All the needed data are already at hand and would doubtless be furnished to the city by the Government if asked for.

The Operation of the Caminetti Law.

Neither the hydraulic miners nor the anti-debris men are rejoicing over the final passage of the Caminetti bill, which is now a law. The valley men do not like it because it legalizes hydraulic mining under certain conditions, and because they will have nothing to say in future about how the mines may be operated. They were always opposed to restraining dams, on principle, and now the miners can build dams and the State courts or anti-debris agents cannot stop or regulate them. The hydraulic miners are not greatly in love with the new law because they must relinquish the right to mine except under the direction of the Government Commission; must build the restraining dams themselves on plans by others, and must pay three per cent of the gross output for the privilege of getting a license to work. Still, in our opinion, as it was impossible to get a hydraulic mining law which would satisfy both parties, it is perhaps a good thing to get one which dissatisfies both, since this is an indication that it is a compromise measure not too greatly in the interest of either. The people of the State were anxious to have the debris controversy settled and to see justice done to the miners, but they did not want any one-sided law or one which recognized the rights of one to the detriment of the other. True, the bill has been masquerading as one intended entirely to rehabilitate the hydraulic-mining industry of California. As originally drawn there were more favorable features for the miner than is the case as it stands, but such was the opposition met that concessions had to be made to get any law at all.

The Government has, however, by this law, committed itself in the direction of rehabilitating this great industry, and will doubtless have to take further action at another time. No immediate results need be expected from the law this year since the Commission is not yet appointed. Even after it is organized, it is required to formulate several plans which may take a year. If the Commission is in a position to issue licenses by next season there will be some companies ready to accept them, since in several instances dams are being built ready for the operation of the law. In most cases, however, the miners will first want to see the character of the restraining works demanded by the engineers. The law is to a certain extent in the nature of an experiment, though it has been proven that debris can be restrained by suitable dams. Whether the miners can build the kind of dams which may be required, and pay the tax, and then make a profit, remains to be seen. This depends on the individual mines and the character of the restraining works. The hydraulic miners have at least one cause of congratulation. Their industry is legalized—conditionally it is true, but legalized. Heretofore it has been under the hand of the law and at the mercy of its enemies. The anti-debris association has had more to say about the mines than the miners have themselves. This law removes their influence, and the miners will have only to deal with a commission of impartial, unprejudiced and honest engineers. It will not take a very great time to appreciate the practical working of the new law and it is our opinion that its features will be found much more favorable to the miners than the conditions under which they have been working, or than they at present realize.

At all events, the hydraulic miners should remember that by complying with certain regulations, they can now operate their mines. As the matter stood before, there were no honorable or legal means of doing this. It is true a recent decision permitted the North Bloomfield mine to go on and work, but the same court stopped another company which was mining under different conditions. A miner now complying with the Caminetti law, and having a license, cannot be interfered with, which, it seems to us, is an important point gained.

The supply and demand for lead are about equal these days, but the price continues very low. The price in London is lower than ever before and permits importations at \$4.10.

The Situation at Cœur D'Alene.

Closing Down of the Bunker Hill and Sullivan Mines.

A few days ago 300 of the 450 men employed at the Bunker Hill and Sullivan mines, Wardner, Idaho, were discharged and the rest will be given their time as soon as all the ore that is broken is run out. Altogether this shut-down will effect some 800 men directly and indirectly connected with the company. The entire product of that region is about 350 tons of concentrates per day, of which this single company turns out 98 tons. If the most important of these mining companies cannot continue under present conditions, it will be difficult for smaller ones to do so. All sorts of reasons have been given for the cessation of operations by people unfamiliar with the facts, but the MINING AND SCIENTIFIC PRESS is in a position to state them truthfully.

The main cause of the shut-down is the high rate of freight demanded by the railroad companies. This, in connection with the depreciated values of both lead and silver caused the directors of the company to close operations until more favorable conditions exist.

On both the Northern and Union Pacific railroads they pay \$16 per ton freight on concentrates, as against the \$6 per ton charged by the Atchison, Topeka & Santa Fe railroad for nearly the same haulage, and as against \$8 per ton charged the Butte and Anaconda mines, while the Bunker Hill and Sullivan has a haulage of only 270 miles more. This rate on 2600 tons of concentrates monthly absorbs a large proportion of the profits. The company ships to both Helena and Denver, as no one smelter can take all their product. The freight and treatment charges combined amount to \$25.50 per ton.

The railroad companies were asked to reduce their rates during the prevailing low prices for lead and silver, and were promised that a proportionate increase would be paid as the values of these products became greater. To this proposition the railroad companies would not listen. The Bunker Hill and other Idaho properties are forced to compete with the cheap labor of Mexico (60 cents a day in American gold) by the railroads bringing Mexican ore from El Paso to Kansas City smelters for \$6 per ton freight charges.

The railroad companies were even offered an opportunity to examine the accounts of the Bunker Hill and Sullivan Mining and Concentrating Co. so that they could see that the statements made were correct. They were also given permission to send their own mining engineers to examine the mines, to verify the condition of the properties. The railroad companies, however, declined all such propositions and refused to reduce the freight charges, so the mines were closed down. They will remain closed, too, until a higher rate is obtained for the products, or there is a lower cost of production, or of freight.

The depreciation in value of the silver and lead has been very great. On the same basis of production and shipment, the profit has declined about 115 per cent in two years, yet the railroad companies will not take this into account. While still making some money, the mining company is sacrificing its ore bodies while continuing operations under the present conditions. The depreciation in two years has been about \$4.60 per ton of crude ore, and as they are working 16,000 tons a month, this is a large sum. The ore value is about the same, but the decrease in price necessitates leaving a lot of the material unworked, thus reducing the length of life of the mine.

By continuing as at present the mines are being really worked for the benefit of the railroads, smelters and miners. The proportion of profit to the investment is insufficient. The chief regret of the company in closing down is the hardship worked on the laborers, though no one could have anticipated such a great depreciation of the lead and silver. In September, 1890, the company sold the lead for \$4.87 per cwt. and the silver at \$1.16 per ounce. In January, 1893, the lead was sold for \$3.79 and the silver for 83½ cents.

It will be remembered that there were serious labor troubles last year at Wardner. At the time of the labor trouble the union laborers demanded \$3.50 per day, not only for miners but for carmen, laborers, shovelers and all, and that only Union union men should be employed. This company then took non-union miners from California to fill the places of the strikers. Some of these men have been getting \$3.50 per day since they were employed. Of 450 men the average wages paid are \$3.42 per day. Over 400 more are at work, indirectly connected with the company's operations.

Referring to railroad rates again, it may be said it is possible to ship the concentrates all the way to San Francisco to be worked at the Selby works here at about \$1.50 per ton less than what is now paid. This would save about \$4000 to \$6000 a month; but all the product

cannot be handled here and there is no market for the pig lead.

The Mexican ores with cheap labor and low freight can pay the duty and get in here to the detriment of our own mines. The railroad south of us favors the smelters in order to get business. The Northern road thinks they have the miners up there "in a hole" and stick to their high prices.

This depreciation in values does not work quite such a hardship on the other Cœur d'Alene mines as they are taking out a smaller quantity of concentrates. The Bunker Hill and Sullivan is, comparatively speaking, a large low-grade mine. Some of the workings are over 60 feet in width in ore. They have a 750-ton concentrating mill, and two miles of Bleichert overhead tramway. This tramway delivers 450 tons of ore in 10 hours at a cost of 10 cents per ton. The weight is carried on a stationary rope while a traveling one moves the ore buckets. Water is brought in a distance of three miles in an enormous flume, carrying 10,000 miner's inches. The mill is down on the river and the Union Pacific tracks run right to it. The Northern Pacific is expected to put a line to the mill before long, which would effect a saving in transportation over that line. At present the ore has to be packed to be shipped over this line.

This company has the reputation of having one of the very best mills in the country. They sent a man over to Europe, and to all portions of this country, to get the latest things in concentrating machinery. Notwithstanding this, the losses in the tailings are as high as \$70,000 per month. This is because the concentrates have to be made of very high grade to pay the exorbitant railroad rates and smelting charges. It is necessary to get as much in a ton as possible. With lower rates they could make lower grade headings and considerable could be saved. The ore is worked now as closely as any in that region. What is desired is to make a lower grade product, which would be better for the company, the railroad and the smelter, but, as explained, the railroad will not listen to any reason, so the mines have been closed down. A few care-takers will be left in charge, but the company does not intend to resume operations until very radical changes take place in the existing conditions.

Carbonate, or Diamond Carbon.

This substance called "carbonate" is found in the province of Bahia, Brazil, and occurs, according to all accounts, in sandstone (itacolymyte). Its hardness is identical with the diamond—specific gravity, 3.012 to 3.200. Some specimens show an imperfect crystalline structure of a brownish-green opaque color, others of a granular structure, porous enough to resemble pumice-stone, dense, very massive, and found sometimes in lumps as large as a walnut. It is now used in the diamond drills.

This substance would appear to be the connecting link between uncrystallized carbon and the diamond, and a scientific examination of it might lead to important results. It was a fragment of this description of diamond that Melville Attwood recommended in the paper we published, with directions how to search for diamonds and to try or test any suspected stones, the hardness of the carbonate being less than the white or "Boart" diamond.

The Brazilian miners distinguish the various diamond-producing soils by the following names:

Grupiara is an alluvial deposit whose surface shows it to be unused bed of a stream or river.

Burgalhao are small angular fragments of rock, bestrewn the surface of the ground.

Cascalho are fragments of rock and sand mixed up with clay and forming the bed of a river.

Takoa curza are the above materials cemented together into a conglomerate mass.

Woodbury Concentrators.

A handsomely-finished Woodbury concentrator, manufactured in this city, was shipped to the World's Fair yesterday, where it will be exhibited in the Mines and Mining Building. Mr. Woodbury himself will probably go on to start the machine up at the time of the opening. A good position in the building has been allotted to this concentrator and it will be in shape for competitive tests if any are desired.

A number of these concentrators have recently been built for Colorado mines. Four have been shipped with a 20-stamp milling plant for a mine in Washington. Mr. Woodbury will shortly bring out a new corrugated belt of his own patent which will be applied on this machine. These concentrators are being tested at the Stickle mill, Angels, Calaveras county, and if everything is satisfactory, will be put in other mills belonging to the same owners.

The Keystone mine, Amador county, which started using one Woodbury concentrator now has a full comple-

ment of eight at work. The managers of this property are very careful, conservative men, and kept on testing so as to get the best results, not taking all the machines of this type until fully satisfied with their work. It will be remembered that not very long since this mine was about to close down owing to the low grade of the ore. Modern improved machines, however, have enabled it to go on. These concentrators handle the ore so it may be worked at a profit, thus giving employment to miners and others which would not otherwise have been the case. We are informed that they are about to work a lot of old material which has been thrown aside and which is only worth \$2 per ton. It is said that by concentrating this a profit of \$1 per ton can be shown.

Mining Briefs.

THE Comstock mining companies disbursed to employees last month \$105,338.

THE large consumers of copper are not buying as promptly as producers would like.

CHINA is said to use 10,000 tons of lead every year in foil for tea-chests. Most of the lead is purchased in England.

MURPHY MINING DISTRICT, a new Nevada camp, is only eight miles northeast of Vanderbilt district, San Bernardino Co., Cal.

THE Bi-Metallic mine, Montana, with its 100-stamp mill, has produced \$10,000,000, of which \$2,140,000 has been paid as dividends.

DURING February there were 2160 flasks of quicksilver received at this port from California mines as against 1543 for the same month in 1892.

THE Granite mine of Montana has yielded a total of \$32,000,000, and has paid out over \$12,000,000 in dividends. The company owns 200 stamps.

TOMBSTONE, Arizona, contributes ten per cent of the \$3000 required to put up a cyanide plant to test the merits of the process on the ores in that camp.

THE California legislature officially congratulated Congressman Caminetti on the successful enactment of the hydraulic mining bill which bears his name.

SOME Montana men have bought a large number of claims at Grand View, Snake river, and will put in improved machinery for saving the fine gold on the gravel bars.

By a vote of 21 to 12 the California Senate adopted Vann's resolution requesting the Representatives in Congress to do all in their power to urge the passage of a bill for the free and unlimited coinage of silver.

THE celebrated mining suit between the Tyler Mining Company and the Last Chance Mining Company, Idaho, which has been on trial in the United States Circuit Court, has been decided in favor of the Tyler Company.

AN opinion, delivered by Justice Blatchford for Chief Justice Fuller, in the case of George A. Pettibone and other striking Cœur d'Alene miners in Idaho against the United States court, decides in favor of the miners, and directed that the indictments against them be quashed. These cases grow out of the riots of the Wardner mines. The court at that time had granted injunctions restraining the strikers from interfering with the men, and it was alleged that Pettibone and others conspired to violate the laws of the United States. The court holds that the indictment under which they were convicted of this charge is defective in that it was not shown that the men had any knowledge of the order of the court. Justices Brewer and Brown dissented.

Personal.

S. ADAMS, a lead miner of Marquette, Mich., is taking a pleasure trip on the coast.

MAJOR FRANK McLAUGHLIN, of Oroville, is again in town and is staying at the Palace.

MR. JOHN MACKAY is rapidly recovering from the wound inflicted by the stock-dealing crank Rippey, and is entirely out of danger.

MR. J. J. CRAWFORD, the new State Mineralogist, has entered on the active performance of his duties at the State Mining Bureau in this city.

JOHN HOBSON, formerly of Placer county, will return this week to British Columbia, where he has the management of some hydraulic-mining properties.

A. E. WALTON, a mining engineer from London, has just returned from the mines at San Luis Potosi and Durango, Mexico, where he has been on behalf of an English syndicate.

J. J. McGRATH, one of the earliest of the Yukon river gold-miners, and who has been on that great river for many years continuously, has arrived here because of ill health, and is recuperating in one of the hospitals.

MR. A. T. HOLMES, who discovered the Holmes mine at Candelaria, Nev., has a very rich mine 36 miles from Pásal, Chihuahua, Mexico. It is known as the San Francisco Cerro del Colorado, or San Francisco of the Red Hill. The vein is 27 feet wide, and averages 60 ounces in silver.

NOT "ON WHEELS."—In the MINING AND SCIENTIFIC PRESS of Feb. 25 was a description of the operation of the Robinson rifle, with a small cut. In the course of the description occurred the sentence: "The operation of the rifle makes an agitation on wheels at the points D," etc. If the reader interested will substitute the words "or whirls" for "on wheels" he will get a better idea of the operation of the device. In the PRESS of next week will be given drawings showing some improvements made in the form of this rifle.

Coast Industrial Notes.

THE Wentworth Boot and Shoe Company, which has a factory near the Sixteenth-street station, is making arrangements to leave Oakland and locate in Santa Rosa.

CONTRACTORS from all over the State are competing with the Oakland firms for the contracts on the new High School for that city. The awards will be made next week.

THE Linda Vista irrigation district directors, San Diego Co., have awarded the contract for laying 70 miles of mains and lateral to Wade & Cooper, whose bid had been reduced from \$278,620 to \$211,130.

THE shipments of salmon from San Francisco by sea in February were 3271 cases and 675 packages, valued at \$20,055. Including New York shipments, the aggregate shipments were 13,095 cases and 675 packages, making a total of \$64,236.

THE values of exports of produce from this port by sea during the month of February were \$3,185,000, as against \$3,707,300 for the same month in 1892. The total since Jan. 1 is \$6,888,700, as against \$7,840,900 for the same period in 1892.

THE electric-railway motormen and conductors of Oakland have commenced the organization of a union. The large number of roads completed and in process of construction will give employment to about 200 men. The standard wages for motormen and conductors are about 22 cents per hour of an average of about 12 working hours per day.

MAYOR CHAPMAN of Oakland, has approved the ordinance granting the Oakland, Alameda and Piedmont Railway a franchise for an electric road from Twenty-third avenue to Broadway, on Twelfth and Thirteenth streets. The company has agreed to lay but one track so as not to interfere with the business of the street. The property owners will make an effort to defeat the franchise.

ALTHOUGH the weather has been somewhat stormy this week, it has not interfered with the commencement of operations in the building of the new Mission-street electric road. Since last Monday nearly 100 men have been at work on Mission road at Silver avenue, near the Five-Mile House, plowing up and grading the roadway in advance of the laying of the roadbed for the electric road on that street from the ferries to the county line.

OAKLAND already has her full share of electric railroads, but still there are more to come. The new electric road to West Oakland will commence operations next Sunday morning. Cars will run from Thirteenth and Franklin streets, along Thirteenth to Grove, thence to Eighth, and along Eighth to Pine and thence to Seventh street, connecting with the local train. The company that owns this franchise now has Oakland hemmed in with electric railroads.

MR. FILLMORE, general superintendent of the Southern Pacific does not think the strike of switchmen in Chicago will affect the California lines. He says: "These men in Chicago who are discontented are members of the Switchmen's Mutual Association, and this association has but a very small membership here. Nearly all our switchmen are members of a district organization, the Brotherhood of Railway Trainmen. Besides, the switchmen here are well paid and are content. Our men, for instance, are paid from \$75 to \$80 per month, and the foremen receive \$90 and \$100. We have not been called upon to raise wages, and we do not anticipate any such movement here as the Chicago switchmen are engaged in."

N. R. HARRIS, of the United States Secret Service, Major Bethel of San Jose, and J. C. Smith of Brentwood, Contra Costa county, owners of the tide land in Contra Costa county which was overflowed during the heavy storm of December last and is still under water to a depth of a couple of feet, have formulated plans for its reclamation, and work is to be commenced as soon as the water recedes sufficiently to permit of operations. The old levees will be repaired and new and more substantial ones constructed. The overflow in December caused a loss to the owners and lessees of about \$30,000. The reclamation of this land will bring about 20,000 acres of highly productive tide land under cultivation again.

ON Thursday of this week the St. Paul, the first steamer of the North American Navigation Co. to leave this port for Panama, sailed away with a full cargo. Merchants of this city are delighted at this step in the direction of emancipation from the transportation monopoly which has been so hurtful to California. The Pacific Mail Co. can no longer accept pay from the railroads for making trips with empty ships and then excuse it by the plea that regularity of rates is better than cheap rates. The North American Navigation Co. has started with a vigor which should insure success. The cargo consists mainly of Pacific Coast products, and is made up of wine, brandy, borax, canned fruit and a miscellaneous assortment of other commodities. Every bit of spare room has been utilized for the cargo, berths being filled and even bulkheads torn away.

As to real estate in this city, the *Circular* says: "The chief inquiry continues to be for outside business properties paying well. Faith in the future is a lost virtue in times of real estate dullness. Buyers are then deaf to everything but the present rent-roll. If it does not pay about six per cent net they are dissatisfied and do not as a rule care to invest. In either lively or dull times four or five per cent net in a growing locality is preferable to even six or seven per cent in stationary districts or in those which have reached a comparative maximum. People are beginning to see now that San Francisco is moving in the right direction to recover the trade it has lost by the railroad monopoly. That fact should help the real estate market." The entire tone of the market is encouraging and hopeful, and spring business is likely to be very good. In the line of building operations considerable improvement is to be noted, and this week's list of contracts is the largest in many months.

Some Points in Silver-Milling by Amalgamation.

NUMBER III.

Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.

In working raw ore with bluestone and salt we do have cupric chloride at first, and cupric chloride can act on mercury, producing calomel; but the cupric salt does not last long; it is quickly reduced to cuprous chloride by various causes, and as there is certainly danger of a loss of silver if that is metallized out of contact with mercury, it seems better to take some risk of adding the quicksilver a little too soon than to run the greater risk of adding it too late. If, however, there should be any fear that the quicksilver may not have been added soon enough, the error may be remedied by using some more bluestone; the cupric chloride thus produced will reconver the particles of silver in the pulp to chloride, at least superficially, and thus facilitate their amalgamation. After all, it is doubtful if calomel can be formed in presence of the soluble chlorides and metallic iron or copper.

The Aaron process is less rapid than the pan process, yet it requires but little power and possesses certain advantages. By this method it is always possible to produce fine bullion, and the consumption of bluestone is reduced to a minimum because the chemical action works in a circle, constantly reproducing cuprous chloride to act on the silver compounds in the ore. Experiments made many years ago proved that the ores of the Comstock lode yielded readily to this treatment, and many millions of dollars would have been saved to the stockholders had it been adopted. The absurd method which has been used in treating the tailings from those mines, and the learned fuss and bother about the base bullion obtained are enough to excite the laughter, or disgust, of those who know what might have been done. But those mines have been in the hands of sharpers and "muscular amalgamators" to such an extent that it has never been possible for any "outsider" to get recognition. Results have been tolerated there that would not have been tolerated in any other camp on the coast, and the sickening part of it is the eulogistic descriptions of the wasteful and stupid methods used which have been published from time to time.

Also, it is well known to the older metallurgists, though not to the ordinary "chump millman"—probably not to the new generation of American operators turned out by scores by our colleges—that fine bullion can be got from any roasted silver ore, no matter what its constituents, though possibly not always in the iron pans which have come to be regarded as a *sine qua non* in amalgamation by a nervous, restless, hurrying people who are never satisfied unless they see something "going like hell beating tank-bark," and who are paying now the penalty of haste and greed by seeing a noble series of mines worked out and half wasted, while one of the great products of the country has fallen more than one-third in value; for it is absurd to pretend that the change in relative values is due to a rise in gold and not to a decline in silver.

The fact is, that both gold and silver have fallen in value in the last 40 years, owing to a vastly-increased production. The proof of this is in the higher rates of wages all over the world, even in Asia. If certain or all classes of products are cheaper, that is because of improved means of production and distribution. The value of silver has declined more than that of gold, simply or mainly because its rate of production has increased more than that of gold has, as the records prove, while, at the same time, the cost of its production has decreased. There are but two ways in which the old relation of the two metals, misleadingly called "parity of value," can be restored: The one is, to diminish the output of silver; the other, to increase the production of gold. To coin silver extensively would raise its price a little, no doubt; but coined silver still exists. It is not consumed in the coining, and such a course cannot restore "parity" so long as the present relative rates of production shall continue. Still less would the issuance of paper money, backed by silver bullion, raise the price, for that silver would absolutely be there at all times; it would not even suffer the consumption due to abrasion, as coin in circulation would; nor would the glut find occasional vent in the loss of a shipload of it by wreckage or other accident to which gold is constantly exposed. Of course, an increased consumption of silver, by which it should be taken out of the market, as wheat disappears, would answer the same purpose as a diminished output; but I refer above to practical means. It is not likely that anybody will buy up silver and dump it into the Atlantic ocean. But this is a digression, yet I would advise miners not to count on a much higher price for silver than the present value—rather, they should be prepared for a further decline.

If the ore contains gold as well as silver, and if the gold is not satisfactorily saved in the treatment for silver, it is advisable to make the pulp alkaline by means of lime, lye or ashes, and work a couple of hours longer. At this time grinding may be necessary, though if that can be avoided it will be better for the next charge, because then the faces of the shoes and dies will retain a coat of amalgam. A little potassium cyanide may be beneficial, or better, a little red oxide of mercury, or other salt of mercury, dissolved in potassium cyanide solution, but not enough to saturate. To see if the liquid is right, put a drop on a gold coin and warm it. It should make a white spot on the coin; if it does not, add more cyanide.

Some ores require to be concentrated before amalgamation, to separate sulphurets, which would destroy the bluestone or would not yield their silver (or gold); the concentrators will require special treatment, generally roasting. The tailings from the concentrators must be run into vats and settled, to remove superfluous water, then treated in the pans, unless the hoss process is used, when pointed boxes may be employed to feed the pans.

I think concentrators will pay for themselves in any silver-amalgamating mill, being used below the settlers. They will save a portion of quicksilver and amalgam which is inevitably lost by settlers, and will also recover some valuable sand which may be again treated. For saving

quicksilver and amalgam, the Hendy concentrator is good, especially if lined with copper and amalgamated; for sandy matter, undecomposed sulphurets, etc., the vanners are better. Some arrangement is required to deliver the tailings to the concentrator in a constant and nearly equal stream, which the settlers cannot do. Here, again, pointed boxes are useful as it is an advantage to get rid of the muddy water which usually contains nothing of consequence coming from the settlers, and use clean water on the concentrators if the supply is abundant.

Sometimes a calcareous ore which contains too much lime for successful roasting can be rendered fit by a partial concentration, which removes the excess of calcite with little loss of value. I have known a case in which very good concentration was effected by simply sifting the rather coarsely crushed ore; the portion which passed the sieve contained \$200 per ton, while that which refused had only \$20 per ton, which, under the circumstances of time and place, would not pay for working. This method of concentration is of wider applicability than is generally known, and might be still more so if conjoined with special methods of crushing.

As I am not pretending to exhaust my subject, nor wishing to repeat much that may be found in the standard works, but rather to offer a few pointers which cannot be found in books, I will say no more about concentration, itself a large subject, and will only make a few remarks on pans, settlers, amalgam and furnaces.

The now almost universally used combination pan is a good machine for its purpose. The wooden staves should be protected to a height of eight or ten inches, either by a high inside flange on the iron bottom or by a special cast-iron ring, to prevent the cutting of the wood by the sand which is thrown forcibly outward by the muller. In default of such protection, wooden staves an inch thick and six or eight inches long may be tacked around, forming a zone, and renewed when necessary.

The settlers, as now made, with plate mullers like the pan, are not very bad, though not what I should like. I sometimes alter the arrangement of the wooden shoes. The older form of settler, with arms furnished with plowshares, rakes and cultivators, was a wretched affair, fit only, like its prototype, the Mexican *lavadero*, to treat the impalpable pulp from the *patio*; but this kind, even, may be made to work as well as any by removing the plows and cultivators, and substituting pieces of scantling extending from the outer end of one arm to the inner end of the next, in such fashion, with regard to the direction of revolution, as to throw the pulp outward. These shoes should not reach very near to the side of the settler, but the speed of revolution should be sufficient to prevent any accumulation of heavy sand there. When I build a settler, I provide a groove about four to six inches wide and three inches deep, surrounding a false bottom. In this groove not even coarse sand can accumulate, because of the strong current produced by the revolving muller, or stirrer; but any considerable object, such as a lump of rock, a cold chisel, etc., which may find its way into the machine, is at once swept into the groove and there remains, disturbing nothing, until a convenient occasion for its removal. The sand and globules of mercury rise toward the surface, pass over to the center, and there fall, to be again swept outward and lifted by the current. In this way, with a plenty of water, the globules of quicksilver are gradually united into masses, which, too heavy to be lifted by the current, fall into the groove and rest in peace until drawn out in the usual manner. Such a settler is described and illustrated in a little book on "Testing and Working Silver Ores," published in 1876 and still on sale at the office of this paper.

Butte County Mines.

NIMSHAW, BUTTE CO., CAL., Feb. 24, 1893.

TO THE EDITOR:—After a long period of waiting, the mines of this former rich gold-producing district are assuming a decidedly favorable outlook. Until the late severe weather interfered to some extent with work, reports of new prospects were of almost daily occurrence. Both quartz and gravel properties are making good showings, and, unless appearances are very deceiving, not many months will elapse before this section of Butte county resumes its former prosperous condition. The Big Butte Mining Co., which lately purchased the Morgan ledge about a mile from this town, has refused a tempting bonus for its bargain, and are breaking ground for a ten-stamp mill. Practical miners who have examined the property claim a great future for it. Rock worked by Mr. Morgan in an arrastre paid over \$30 per ton gold and the sulphurets assay upward of \$200 per ton of ore.

Near Powelson and Inskip several ledges have lately changed hands at fair prices, and work will be started on them shortly. Miners in this locality have been handicapped on account of there being no mill, hence little prospecting has been done for milling quartz. With a mill in this district, the early opening of several good mines may be looked for. Among the late strikes in gravel is that of McLellan & Hupp, on Mosquito creek, which has caused quite a ripple of excitement—\$60 to the pan is not an every-day prospect. The owners are running a tunnel and will strike the channel in about a month. The Oro Fino is paying very well. At the Indian Spring heavy work is being done in passing the falls, just below which very rich gravel was found.

The Butte Bell Co. are driving a bedrock tunnel, said to be one of the finest pieces of work in the county, but only in keeping with everything this company undertakes. They expect to strike the channel in about 200 feet, and should it prove as rich as in the adjoining claims, look out for a big boom in this camp.

The Reardon-Palace drift claim is again in pay, with good promise of permanency. John Hupp takes the pessimism on nuggets for the season; the two-pounder taken from his Little Butte property is high luck. The Ohio and Schmidt claims, above the forks of Butte, are producing some fine dust. The old Blackleg drift claim near Nimshaw has, after a sleep of years, been reopened, and is

showing up in a manner indicating an early return to old-time prospecting. Gold lately found gives positive proof that the lead lost many years ago is again discovered, and it is now but a question of a short time that this famous property will take a leading place among the producing gravel mines of the State.

The celebrated Pershbacker mine still remains idle, rumor says, awaiting adjustment of titles. Why this property, acknowledged to be the richest drift gravel mine in California, should be kept shut down for years, is beyond the comprehension of "honest miners." It is to be hoped that the several surveys of the past year are not without significance, and spring will see work resumed permanently. Hoping the foregoing may prove interesting to the many readers of your valuable paper, I am yours respectfully,

J. C. B.

San Bernardino Mining Districts.

VICTOR, CAL., March 6, 1893.

TO THE EDITOR:—The Vanderbilt District is coming to the front. It is located about 30 miles from Goff Station, on the A. and P. Railroad. About 12 miles of track have already been laid on the new railroad which will pass through Vanderhilt, thence through the New York District and will finally be built through part of Nevada and Utah. It will pass through some of the richest mining country in California. There are 40 men working on the group of mines in the New York District which property was purchased by a Denver syndicate. At Danby this same company has bonded mines from Marcus Alby Thompson, and is doing considerable prospecting work and development upon them. They are proving up all that could be expected, showing up some very rich ore.

At Calico, the Silver King Mining Company, Limited, is running its 30 stamp mill day and night, and is shipping its usual quantity of bullion. The mines are looking better than ever. The borax mines have been sold, and are increasing their output of boric acid from 10 to 18 tons per day. Mr. Perry still has charge of this property. The force of men working these mines has been increased. At Oro Grande, Vyman Gruendike & Co. are mining a large quantity of limestone, which they convert into lime. This rock makes as good lime as can be obtained on the Pacific Coast. At Victor, a company of Eastern capitalists has been formed, their object being to dam the Mojave river at the narrows, near the town of Victor, and, by running ditches, irrigate a large portion of the Mojave desert. This is the finest location for a smelter that your correspondent knows of, there being plenty of gold, silver, lead, copper and iron ores, also timber and water right in the vicinity.

Twenty-nine Palms mining district will come to the front in time. There are probably some very good prospects there, but they need capital badly. At Perris, the Good Hope mine is the only bullion producing one at the present time. They shipped a bar of gold from there last month. At South Riverside, the tin mines are deserted; nearly all their stores have been sold at constable's sale.

ALBERT MINER.

Progress of the Production of Nickel.

The use of nickel has been of late so largely on the increase that special steps have been taken for an increased production of the metal. The production of nickel, which was about 400 tons in 1878, the year of the discovery of the New Caledonian ores, now exceeds 5000 tons per annum, and the New Caledonian supply has been so supplemented by the yield from other districts that a supply of about 10,000 tons of pure nickel per annum may shortly be expected. Nickel is found in New Caledonia in a single mineral, garnierite or noumeite, which is a bright green hydrated silicate of magnesium and nickel. The most improved plan of extracting the metal from the ore consists in reducing the latter in a regenerative furnace resembling in structure the type of furnace used in Belgium for reducing zinc oxide. The reduced metal is afterward sifted to separate the cubes or disks from irregular and broken masses; they are afterward collected by means of magnets. Among the more important of the recent applications of nickel is that of the alloy (20 parts of nickel, with 80 parts of copper), which is now used for the casing of bullets for some of the small box rifles which European countries are adopting in their armament.—St. Louis Globe Democrat.

INGOT CAST STEEL TOOLS—A French journal says: "The Acieries de Saint-Denis are offering at present tools and mechanical pieces generally manufactured according to a method, and with machinery permitting the supply in ingot steel (*acier fondu*) of articles which hitherto were made of steel iron or cemented cast iron. It is notorious that annealing, for one product as for all, is the cornerstone upon which they depend, and annealing, notwithstanding repeated care, is irregular. The metal results either too malleable or too hard. With ingot cast steel (*acier fondu coule*) having for base a central substance, finished iron only, to the exclusion of crude iron or steel, the Acieries de Saint-Denis obtain an ingot steel (*acier fondu*) the fluidity of which permits the manufacture by casting in pieces or tools of a weight inferior to 15 grammes. This steel, owing to its homogeneity, has a maximum density. It can be tempered like any other ingot steel. Its resistance to fracture exceeds 65 kilogrammes; its elongation is 15; its content is: C, 227; M, 950; S, 630; PH, trace. The crucible furnaces are of special construction with refrigerating and hot-air apparatus; they are mechanically actuated. The fusion temperature is approximately 2400°. It is incontestable that with the present tendency to replace tools of iron sheathed with steel by those of solid steel, this new method of manufacture has a great future. The same tendency exists for mechanical pieces. Here the engineers, having to temper certain portions of the pieces, and being able to do this, if iron is used, only after cementation, will find the process of considerable advantage. The solid-steel articles are no dearer than those of sheathed steel.

Cyanide Works in Africa.

The following article in reference to what Charles Butters is doing at Johannesburg, South Africa, was taken from the *Johannesburg Star*. Mr. Butters, it will be remembered, built the reduction works at Kennet, Shasta county, in this State:

Chas. Butters, who has so ably managed the Robinson Chlorination Works, has now nearly completed the new chlorination works just below Prospect township. These works, which are being built by a company raised by Mr. Butters himself, are but the beginning of larger and more commodious works, capable of treating a very much greater quantity of metallurgical products. The roasting furnaces, built after a particular pattern of Mr. Butters', will enable somewhere about 400 tons of concentrates to be treated per month. Everything will be in full swing next month, but even now Mr. Butters is prepared to buy tailings and concentrates. He is prepared also to buy and refine cyanide slags (which are now shipped to Europe), iron accumulating in the mortar boxes, which contains more or less gold, and copper plates that also contain gold. Mr. Butters is thus another buyer in the market for concentrates, and as buyers are few and the companies could, if they pleased, produce considerably more concentrates than they do, at a very small cost, new enterprises like this will give an incentive to companies to bring more concentrates into the market. Later on, when their works are extended, Mr. Butters hopes that the company will be in a position to treat lead, copper and silver ores.

The tankhouse is well in hand and will be in order by the time the furnaces are properly started, whilst the offices and smelters may be said to be ready for use. The manager's house is a fine-looking structure just ready for occupation. The furnace will be fired for drying purposes towards the end of the week.

CYANIDE WORKS.

The company has already completed, and working, cyanide works just below the Crown Reef battery. The capacity of these works is 1700 tons of tailings a month, and it was from here that the bar of gold was taken which was wrongfully attributed to the new chlorination works. A second cyanide plant is also in course of erection in another part of the rand, and this plant, when completed, will be capable of treating about 2000 tons of tailings per month. Both these plants will be worked on the MacArthur-Forrest principle under the personal supervision of Mr. Butters.

THE WORKSHOPS.

Recognizing the greater facility in obtaining skilled labor by having the workshops in Johannesburg, Mr. Butters has had erected extensive workshops at the corner of Market and Delver streets. Here he has a foundry, machine, blacksmith, carpentering and pattern shops, all in working order, where everything is manufactured for the different works. The workshops are large and airy and take up considerable extent of ground. Altogether the Rand Central Ore Reduction Works are calculated in the near future to help very materially in the output on the rand. Chlorination works like those belonging to this company require a considerable outlay of capital, and it speaks well for Mr. Butters' faith in the future of the fields that he should be willing to advise the expenditure of capital in this direction. Concentrates are so easily obtained, and at such a little cost, that the supply should be perceptibly increased. They go far towards paying the expenses of milling. Last month the Ferreira received a check for £2500 for a parcel of concentrates; the Wemmer received £800 for a parcel and the George Goch, which obtains its concentrates by the simple method of a double length of blanketing, netted last month about £400 for concentrates. As the companies produce more concentrates, so Mr. Butters is prepared to increase the size of his chlorination works, and, if necessary, put up fresh ones in other parts of the rand.

The Tin-Plate Industry.

Special Agent Ayer has submitted another report to the Treasury Department on the development of the tin-plate industry. The period covered by this report is the quarter ending December 31, 1892. The report shows that during that period 32 firms produced 19,756,491 pounds of tin andterne plates proper. The same number of firms produced during the previous quarter 19,952,725 pounds. Of the production of the past quarter, 6,138,739 pounds, or a little less than one-third of the whole, were bright tin plates, of which 5,274,434 pounds, or about 86 per cent, consisted of the class of plates weighing lighter than 63 pounds per 100 square feet; 13,617,752 pounds wereterne plates, of which 12,684,646 pounds, or more than 93 per cent, belonged to the lighter class of plates. Of the 32 firms who submitted their sworn returns for the quarter, nine firms made and used their own black plates exclusively, five others used only American plates, eight used both American plates and foreign plates, and ten used only foreign plates. The American plates are generally preferred by manufacturers to the foreign. Full returns from the importing and exporting ports of the country show that of the class of plates weighing lighter than 63 pounds per 100 square feet, there were imported during the fiscal year ending June 30, 1892, 374,697,000 and of the same class of plates there were exported 136,773,190 pounds, making the net importation for the year 237,923,816, one-third of which is 79,307,939 pounds.

Under existing provisions of the law, American manufacturers must produce during one of the fiscal years ending June 30, 1897, one-third of the net importations of one of the said years. If it be assumed that the importations will be less during any one of the remaining years specified, the amount of the lighter class of plates which must be produced by American manufacturers but in one of the six years in question may be positively stated at 79,307,939 pounds. Agent Ayer thinks it probable that this amount will be equaled during the present fiscal year. The report

states that the Temescal tin mines in south California and the Harney Peak mine in South Dakota have suspended operations, and suggests that, inasmuch as it now seems probable that the tin mines of this country will not be developed in the near future to an extent that will afford an adequate product of the metal, it is worthy of consideration whether, in the interest of tin-plate manufacturers, the law which imposes a duty of four cents per pound on and after July 1, 1893, on Cassiterite and bar, block and pig tin might not be advantageously repealed.

Jeff Doolittle's Idea of Gravel Mining.

Jefferson E. Doolittle, one of the owners of the Gould & Doolittle placer mine, near Gold Run, Placer county, and of other mines in Nevada county, is at the Palace. Mr. Doolittle says the indications are that this will be a very lively year in gold mining.

"The more I mine the more I am convinced," said Mr. Doolittle, "that there is just as much gold to be got from the California mountains now as there ever was in forty-nine or in the fifties. In fact, there is a great deal more in a given area than was found at that or any other time. Why don't we have the booms, then? We will have them eventually, but one reason why they are delayed is because much of the rich surface gravel is worked over. Now we have got to go under the lava, or whatever rock stratum overtops the old channels, and get out the gravel by drift mining. That has been found about the best way to get at the gravel. A tunnel is run in on the channel under the cap rock and then drifting is done to the right and left and the gravel brought out to the main tunnel on a wheelbarrow and thence conveyed outside and the gold washed out."

"There are a great many underground gravel beds, rich in gold, being worked in this way now in Nevada and Placer counties, and they are found exceedingly profitable. The dirt is just as rich as that found on the surface in the old days. The number of drift mines is steadily increasing and I am satisfied the gold output will as a consequence be largely augmented. Of course there are a great many open and unobstructed valleys being found at times that are more or less rich, and which can be worked on from the surface down. In some of these the gold is reasonably plentiful from the grass-roots down, but on the bedrock, which may be in some instances hundreds of feet below, it is always a great deal richer than at the top. There, generally speaking, all the nuggets and coarse grain gold are found."

"El Dorado, Placer, Nevada and Tuolumne county miners have now pretty well concluded that they will give especial attention to going under the lava cap-rock, and also going to bed-rock on the rich open ground. More of such mines are being opened than ever before. The shallow, open gravel beds, those that require only a short distance to bed-rock, were the ones the '49ers chose to work on. As a rule they have been pretty well gleaned of the gold, and now these others remain in almost measureless extent and numbers. In these there will be great booms, I have no doubt. Everything points that way, and 1893, I think, will be livelier in gold mining than for many years."

Mr. Doolittle has been a gold miner in California all his life. When as a child in the Sierra foothill mines he first began to play in the dirt he began washing out gold. He says real mining there has only begun.

What the Miner Wants.

He wants a "false set" of teeth for the "mouth of the tunnel," and a girl of experience to paint and powder the "face of the drift."

He wants a four-in-hand tie for the "collar of the shaft," and a boot for the "foot of the incline."

He needs a jockey who can ride a "porphyry horse" and use the "spur of the ledge" on a "bucking donkey" (pump) and "drive a crosscut."

He wants an "expert" burglar to "tap the ledge;" a detective to "follow the vein," and a watchman to guard the "silver plate."

He wants a hat that will fit a "head of water," and a man who can wear the "cap of a tunnel-set."

He wants a soldier who has been "drilled" to handle a "gun" and to "shoot," and work a "battery;" also a painter who can distinguish a "color."

He wants a "square set" of men to work for him, some feed for his "giraffe," a bird for the "cage," a hunter to hunt the "gopher" and a "grizzley" and a sprinter to "run a drift" against time.

He wants a tidy man who will put an "apron" on and "clean up" the mill, sweep up the "dust" and "wash dirt."

He also would like to have the Government furnish him with "stamps" free of charge.

He wants the "roof of the drift" shingled with twenty-dollar pieces.

And when he "dies" he wants to go to the "upper level" and play on a silver "horn" and have his "slap-jacks" baked in a "gold pan." HOT STOVE MINER.

The New Smelter at Los Angeles.

The Los Angeles *Times* says: Work is to begin at once upon the buildings and furnaces for the new smelter, which is to be located near Ninth street, on the east side of the Los Angeles river. The plans, which were seen yesterday by a *Times* reporter, at the office of the company are quite elaborate, and prove that the new institution will be a model one of its kind.

Dr. F. M. Endlich, the general manager of the Southern California Smelting and Refining Company, who has just returned from Chicago, brought with him the plans, which are to be at once submitted to contractors, and, as soon as bids are received and accepted, construction will begin at once and pushed to completion.

Dr. Endlich explained to the reporter his system for catching flue dust from the furnaces and preventing its escape into the atmosphere.

"You will see," said the doctor, "that we will conduct all flue-dust, which is the same as smoke, into a dust-cham-

ber which is 90 feet long, whence it passes into a smoke-stack 99 feet high. Throughout the length of this dust-chamber will be obstructions, or dams, made of brick, nearest the furnace and canvas at the extremity toward the stack. These obstructions will catch the solid particles of dust so effectually that there will be scarcely any dust in the smoke which finally escapes 110 feet from where it originated in the furnaces. Running throughout the length of the bottom of the dust-chamber will be a screw which will carry out and deposit in a receptacle all the dust which settles in the bottom. It is estimated that nearly 5 per cent of the ore passes from the furnace with the smoke. This dust is valuable, and it is to our advantage to save as much of it as possible."

"How will you use this dust?" asked the reporter.

"We put it back and smelt it and save the dust it contains. As a matter of fact, this contrivance, which I invented myself and have already used successfully, saves all the dust and prevents it poisoning the air."

"How about the sulphur fumes?"

"Oh, they come from the roasting furnaces, which will have a dust-chamber about 30 feet long and a stack 60 feet high. The character of the ore which we will handle will not call for frequent use of the roasting furnaces. I do not think we will have to resort to roasting ore more than 40 days in the year. What sulphur fumes are liberated will be so dissipated by the air as to be unnoticeable and consequently not injurious. There has been much prejudice against this enterprise, but there can be no complaint against it when once its operation is seen."

"What will be the capacity of the works?"

"At present from 70 to 80 tons of ore a day, but, as you see by the plans, we have provided for an extension, with two additional furnaces, which will give us a capacity up to 250 tons."

From Dr. Endlich the reporter learned much about the *modus operandi* of converting crude ore into refined silver. From the time that the ore is dumped into bins from the cars, which will be run direct to the works by means of spur tracks from both the Santa Fe and Terminal roads, until it emerges in bright, shining metal pigs, it passes through a variety of operations quite bewildering to those who have no technical knowledge of the business.

The machinery will be furnished by Fraser & Chalmers, of Chicago, and several carloads of it are now ready for shipment and will arrive by the time the railroad spur tracks are built. There will be 130 tons of this machinery.

A California Mine Owned by Ladies.

A correspondent of the Tuolumne *Record*, in writing of the Martha Washington mine, says:

The features of this corporation differ essentially from all other mining associations, in that its membership is confined exclusively to the feminine gender. No male need apply. Neither is the stock of the company made transferable to the masculine gender. Thus its mining pursuits are delegated to a board of directors chosen by the company, which board direct operations under the able management of Byron C. Hall, who is assisted in the multiplicity of plans, changes to be wrought and faults remedied, that naturally arise as work proceeds, by Mr. W. H. Purdy, practical engineer, who is thoroughly schooled in the new system of placer mining, as well as in the old methods of working auriferous sands and gravel and separating the gold therefrom. The company is duly incorporated under the laws of the State, with the view of devoting its attention to the further development of the mineral resources of the State, having their headquarters at San Francisco.

This property, now known as the Martha Washington placer mine, was formerly the John Pereira placer claim, and is situated on Peoria Flat, 12 miles in a southwesterly direction from Sonora, and lying between a range of hills along the south bank of the Stanislaus river and Table Mountain; distance from base to base, one-half mile at that point crossing middle of claim. This mine covers a large tract of mineral land, embracing an inexhaustible body of gold-bearing gravel.

The company, for the past eight months, has been engaged with a force of men constructing ditches and flumes, both for conducting water and gold-saving, and has also finished laying 5000 feet of 11 and 16-inch pipe—bulkhead at an elevation of 370 feet above the level of where the electric plant will be put in place, and the hydraulic giant set to working to wash off a bench of ground where it is proposed to set the necessary machinery for final operations. These are preliminaries toward the introduction of the "Bennett system" of placer mining. We shall, by special invitation, be promptly on hand on the day the machinery is set in motion, constituting the "Bennett system," through power transmitted from the electric motor, and it is hoped that its supremacy over other systems of placer mining hitherto in vogue in this county will be fully established.

As evidenced that Mr. Hall, manager of the company's mining operations, is theoretically and practically qualified to carry out all necessary plans in attaining the objects aimed at, we find he has operated extensively in the Atlantic States—Pennsylvania, Virginia and a number of other States—in the coal mines and in the gas and oil regions with great success, having had under his supervision from 1000 to 5000 laborers, engineers and mechanics. It is said that whenever he placed a force of men boring for oil, invariably his instructions were: "Now boys, remember, it is petroleum or hell," and that auger was kept sinking until success crowned the undertaking; hence we find the right man in the right place. Mr. Hall has been on the coast eight years, and during that time has shaped and put in successful operation a number of valuable mining enterprises.

To return to a further description of the mine—its value and prospects of proving remunerative to the company, of course, remains to be determined. The undertaking, however, on so gigantic a scale, has set many of the speculative minds among the old hydraulic miners in the county

to thinking and wondering what will be the ultimate outcome of the enterprise. Be that as it may, the operations carried on at Peoria Flat (Martha Washington mine) in years gone by, that were confined merely to surface workings, furnish no index of what the deeper deposits of gravel may contain in mineral wealth. The depth of these deposits have never yet been determined, and past experience has proven, without exception, that in other localities where beds of gravel of like formation have been worked, that the deeper or underlying strata carry a greater percentage of gold. It must be conceded that such placers as now being spoken of differ materially from that character of mineral lands which make up the greater bulk of the rich placers of this county, because these deposits reveal the fact of having been the channels of ancient rivers scoured through in many places by action of volcanic flow.

In view, then, of these facts, as the company has chosen old Tuolumne for their mining ventures, and come to stay, with their capital and energies combined, to open up a new era in placer mining in the county, strictly merit the support, encouragement and best wishes of all good and well-meaning citizens.

Colorado Mines.

S. B. Clark of Aspen, Colo., who is in California contracting for fruit to supply his commission house at that point during the coming seasons, tells the *Los Angeles Times* that Colorado, despite the depression of the silver market, is progressing as rapidly as ever. "Indeed," added Mr. Clark, "we have not felt the depression in Aspen, and probably won't, as with the drop in the price of silver the demands of mine-owners on railways in hauling and smelters in reducing to meet the drop in sympathy was acceded to without a murmur, which fact acted as an incentive to increase the product from the big mines, while local capital put in two large smelters, one, the Holden smelter, now working 300 men, and another, owned by a stock company, giving employment to 75 men.

"Of course the little mines, away from railway lines and smelters, and those producing low-grade ores, closed down, but the majority of our mines, all our large ones in fact, produce high-grade ores, and being well developed, can work a large force of men.

"I have not the least doubt," continued Mr. Clark, "that the mines of Aspen, Leadville, Ouray and similar high-grade ore-producing districts could make money should silver drop to 65 cents. Of course, we hope silver will not drop to such a price, and all of us are firm in the belief that it will increase in market value as it should.

"What mines are being worked at Aspen? Well, the Aspen group is working full-handed, as is the Durant group and the Dellas, Bushwhacker and Regent. The old Molly Gibson is working all the men she can give room to; she paid over \$2,000,000 out in dividends last year, and from indications will exceed that amount the current year. The Smuggler is now working about all the men she can use, while the Aspen Mining and Smelting Company is again working at full blast on its properties.

"In Tourtelotte Park, just over, or rather on top of the hill, the Celeste, Edison, Lotta and Last Dollar mines are working full-handed, while a number of smaller properties in the immediate vicinity are also producing.

"No, our smelters cannot handle all our ores. We ship to Pueblo, Denver, and even to Great Britain, but only the very refractory high-grade ores go across the water, to be worked at Swansea, Wales.

"I should say there were employed in the Aspen mines 5000 miners, who are paid \$3 per day; probably 1000 more are employed in the surrounding smaller camps dependent upon Aspen for supplies."

Nevada Antimony Mines.

It may not be generally known, but nevertheless it is true, that Lander county has the richest and most favorably located antimony mines in the world, and the veins are larger and better defined than any other yet developed, says the *Reese River Reveille*. We refer to the Big Creek antimony mines, owned by the Big Creek Mining Company, situated 14 miles south of Austin, in the Toiyabe range of mountains on the western slope thereof, and on Big Creek.

The mines are situated on the south side of the main canyon, about 1300 feet from the bed of the canyon, and the ore from the vast ledge in the mines is conveyed therefrom on an aerial tramway to the ore-house below, with very little labor and at a minimum of expense. The capacity of this tramway is fully 50 tons every eight hours, hence one can form some idea of the rapidity with which the ore from the mine can be handled. There are at present nine men employed at the mine extracting ore from the stopes, some days breaking down as much as five tons of rich sulphide, and other days not so much, all depending upon the amount of ground opened up for active stoping.

On entering the Beulah mine in midlevel, between levels 3 and 4, we find a stope opened up on the ledge fully 100 feet long, and the rich ore streak in the same nearly three feet wide on an average. The whole of this vast ledge will assay well up to 65 per cent antimony, and to say that the ore, as we saw it in the ledge and was being taken out by the miners, was dazzling is putting it very mildly. We are much impressed with the great richness of this mine, and we challenge any one to tell us of a better one. Holding a candle so that the light would reflect on the bright ore, in some places lying in heaps as it had been blasted out of the ledge, and looking ahead for a distance of 40 feet or so at the mass of ore that had been "stripped" by the boys preparatory to taking out, and again at the face of the drift, where we saw the same rich ore in sight going west on into the mountain, we saw something that we shall not soon forget, and, we venture to say, can only be seen in the Big Creek antimony mines, 14 miles south of Austin. Superintendent Bray opened up this mud level in the mine the early part of last summer, and as soon as

the ground was in order for stoping extracting began. From this piece of ground, or since August last, the company has taken out about 400 tons of rich ore, and there is certainly more than this yet to take out before the level above is reached. In our somewhat inexperienced eyes it looked as though there was a mountain of rich ore in sight.

Wayside and Ornamental Trees.

An essay by A. L. BANCROFT of San Francisco and Contra Costa, read at the February meeting of the State Horticultural Society.

As the traveler moves along the roads of Central and Northern California, even in the more thickly settled and level portions of the farming country, the appearance of the roadsides is, as a rule, far from pleasing. Barbed wire and split picket fences border the roads, and the dry grass on the margins, in the summer, is heavily coated with brown. The roads themselves are deep with the finest of powdered dust, which rises in clouds as the heavy teams stumble and kick their way through it.

The passing of the homes of the "Dago," "Portigee" or family from the Fatherland or the Emerald Isle which have intruded themselves upon us within the generation does not give much relief to the somber hue of the surroundings. The front yard may be a horse or cow corral and the flower garden a pig-sty. The road in front of the house is likely to be occupied with the hay-wagon, a cultivator out of season or a broken-down thrashing machine.

Nor does the approach to a schoolhouse and grounds where the buds of the family should blossom into beautiful youth and vigorous, healthy young man and maidenhood raise the spirits of the depressed traveler to any great extent. The yard is more than likely to be bare and brown and be occupied by promiscuous and scattering groups of horses, carts, harness and saddles belonging to the children who come from a distance. The base of the house shows the marks where last winter's mud was rubbed off by the bands of roving hogs. The ever-present and necessary out-buildings, bare and bold, occupy the farther corners of the yard. And this is where our children are to spend much of their week-day time!

As we pass along, a few trees may be seen—some alive, vigorous and beautiful, but often the remains of many which died young, showing good impulses on the part of the land-owner, but also indicating weariness in well-doing or ignorance as to the means to be taken to score a success in this direction. These failures are many times pitiable to see.

Much of this might be and should be better. Some shade and ornamental trees near the roads; a short stretch of painted fence in front of the houses with flowers and shrubs in the yards; sprinkling the roads where the condition of the country and the travel upon them would justify it, are things which would help. The naming of the roads, the systematic numbering of the country houses, naming of the home itself, are influences which tend in the right direction in such progressive efforts.

The school grounds should be models showing what it is possible to do in the line of ornamentation—experimental grounds where the children would not only have their beauty to enjoy, but would be surrounded constantly by object-lessons, which would teach them how to produce similar results at their homes. California is a large State, and certainly from six to ten acres of it is not too much to devote to each of its country schools. The grounds should be divided into three enclosures. A small one enclosing the building should be filled with shrubs, flowers and a few trees artistically planted and highly cultivated, each child having a few square feet assigned it, the work upon which should be done entirely with its own hands. The larger scholars could also help upon the work about the grounds. Most of them would gladly spend an hour after school occasionally at such work if led and instructed by the teacher or a competent gardener. Upon one side there should be an enclosure for the horses ornamented with a line or several lines of trees and shrubs fenced off along the front and on the side next to the school. Shade trees and water for the animals should be provided and also a building for sheltering the carts and in which to store the horse traps. Upon the other side of the school-building should be the playground, with room enough for baseball, football, etc., for the boys, and more sheltered spots for lawn tennis, croquet, etc., for the girls' outing. Some fruit trees in this enclosure would not be out of place.

It is said that where flowers have been set out about schoolhouses that the appreciative visitor takes not only the flowers in bloom, but the plant—root and branch as well. The ideal country schoolhouse would be one that would have a library large enough and filled with books to interest all, both old and young, in the district; to have a general meeting room which could be lighted and warmed during the winter evenings, where any and all could gather and spend their evenings. In fact, make of it a country clubhouse. With a family living in the house to care for it, the flowers and plants in the grounds would be safe from the intruder.

The present California road law provides as follows:

May Plant Trees.—Section 2633. Any owner or occupant of land adjoining a highway not less than three rods wide may plant trees in and along said highway on the side contiguous to his land. They must be set in regular rows, at a distance of at least 20 feet from each other, and not more than six feet from the boundary of the highway. If the highway is more than 80 feet wide, the row must not be less than six nor more than twelve feet from the boundary of the highway. Whoever willfully injures any of them is liable to the owner or to the occupant for the damage which is thereby sustained.

This to some extent gives shape to what may be done in planting wayside trees. Of course, all may do as they like along their frontage inside of their own lines.

Kinds of Trees Available.—Some of the kinds of trees having but little or no economic value which would be available, would be the Blue Gum, Monterey Cypress, Monterey Pine, Locust, Osage Orange, Pepper, Lombardy and Carolina Poplars, Cork Elm, European Pine, Texas Umbrella Tree, Acacia, Native Laurel, Eucalyptus-diversicolor and E. Polyanthem. It is also said that some of

the slow-growing hardwood trees of the East will do well in California, such as the Maple, Elm, etc. The Eucalyptus Globulus may be made to contribute to the fuel supply by planting them upon a division or cross line, or as a wind-break. By setting them quite near together, say about eight feet, after the trees are about five or six years old every alternate one could be topped about 12 or 15 feet above the ground. The tops can be used for firewood, and a new growth will soon replace the old one, and the trees will become more stocky. In say three years those left growing can, in their turn be topped and then each five or six years the tops of half of them can be taken for fuel without affecting the vigor of the tree. Each time the cut should be a few inches lower than the previous time.

In some parts of Germany the roads are lined with German prune trees. They belong to and are cared for by the road management. When the fruit upon them is well advanced the crop is sold at auction and the proceeds go to the road fund.

While we in America would naturally not manage the thing in this way, there appears to be no reason why the owners of frontages upon the public country roads should not set out trees upon them which would combine beauty and usefulness, and retain all of the crop, which the passers by would allow, for their own use. There is available for this use the California Walnut, the same tree worked over to the English Walnut, the several varieties of chestnuts, almond, olive, cherry, prune, crab apple, fig, etc. For ornament the manner of pruning the roadside trees would naturally be somewhat different from that used in the orchard; but they can be pruned for ornament and still produce a fair crop. No more beautiful tree can be found than the olive, and the crop should be a material item. The crops from such wayside trees should pay for the cost and care of the trees and a profit besides. In the no-fence counties, where feasible, the fences should be removed in order that the trees may be cultivated on both sides. This leaves no uncultivated strip to dry out and furnish a harbor for gophers, squirrels and weeds. Evergreens should be avoided upon the south side of roads running east and west, as the shadows cast upon the roads will keep them muddy during the wet season.

The Care of Trees.—The only places in California where some kind of an ornamental tree cannot be made to grow is where it is all rock or all water, or where the soil is impregnated with salt or strong alkali. Care, however, is required in establishing them in their new location. The boles should be large and the soil be well pulverized, and the surface soil filled in first when the trees are set. The trees should be set so that they will be but about an inch deeper after transplanting and the earth becoming settled, than they were when standing in the nursery rows. Now, trees, in order to grow, require moisture. It must either be "kept up" by cultivation, or the trees must be irrigated. Many trees, like the Eucalyptus, Cypress, Pine, Pepper, etc., will take care of themselves, and do well without either cultivation or irrigation, provided they are watered by hand and the soil stirred at times during the first one or two years while the roots are striking down and establishing themselves.

The way to water young trees is to dish out the ground about them so that it will hold a whole bucket of water. Give each one a full bucket or more. The following morning stir the damp soil and cover with fine, dry dirt to prevent cracking and drying out. They will require no further attention for a week or ten days. The second year they should require less attention, and by the third year should be able to get along well without anything further than an occasional stirring of the soil to keep it well pulverized and to keep the weeds down and thus prevent them from drawing the moisture from the soil, which the trees themselves require.

Co-operation.—In wayside ornamentation, if the people of a school district would organize and improve the school grounds, cemeteries and roadsides of the entire district; or of the roads in front of the places owned by the members, and have some one competent person superintend and direct the whole work, better results would probably be obtained for the amount of time and money expended, than in any other way. The situation, as a whole, could be considered, and while a variety of effects could be secured, it at the same time could be made a harmonious and pleasing whole.

No Need of Salting the Mine.

Charles F. Danford of Boise city, Idaho, is at the Sherman House, Chicago, and tells the *News* the following:

"I used to be a miner away down in the southwest corner of Idaho," said Mr. Danford.

"We had a big mining camp down there between Topaz and Squaw Creek, and it was as tough a camp as you'd wish to meet in a day's walk. There were two great partners in the camp known simply as Bill and Joe. You never saw two such close friends—they ate, drank, slept and worked together. Joe and Bill had a claim about a mile from camp. Of all the fellows in the camp they had had the worst luck. Their mine scarcely paid their whisky bill, to say nothing of their losses at poker. The poor boys were notorious for their bad luck. Finally they concluded our camp was a 'Jonab' for them and that they would sell out and leave. Of course, they couldn't sell such a dead mine in our region, so they decided that Bill should travel to parts where it had never been heard of and endeavor to 'unload' the mine, while Joe should stay and continue work. Before Bill departed they between them fixed up a lot of the most monstrous and seductive lies ever dreamed of.

"Bill sallied forth, armed to the teeth, as it were, to snare the unwary, and his glowing description of their mine nearly landed a purchaser a time or two. Joe worked away patiently at the mine. Finally one day, about a week after Bill had left, he struck it rich. He rushed to the telegraph office and sent the following message to Bill:

"Dear Bill: Don't sell the mine. Our lies are all true. Joe."

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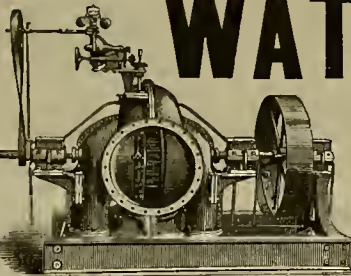
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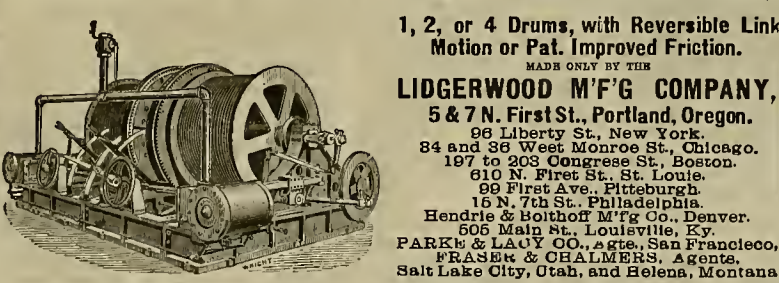
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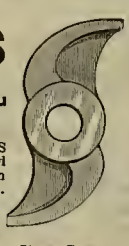


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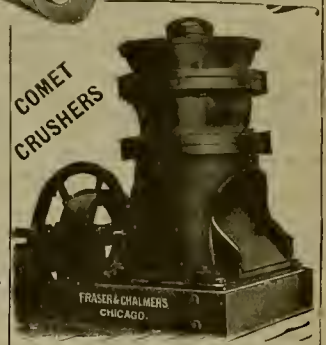
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Large Ocean Steamers.

Those who are interested in fast passages across the Atlantic may expect to see the record made by the City of Paris last October (5 days, 14 hours, 24 minutes) lowered by several hours, says the New York *Advertiser*. Two new steamers are to be added to the service of the Cunard line. One, named *Lucania*, is to be launched today at the yard of the Fairfield Company at Govan, near Glasgow. The other, the *Campania*, is nearly ready. These two vessels are to commence running in May.

They are sister ships, and have taken nearly two years to build. All the work on them has been carried out with the utmost secrecy, especially the construction of the boilers. They will be the largest vessels that cross the Atlantic, and have been built with the idea of winning the records back again for the Cunard line.

These two vessels were built alongside of each other on the Clyde, and at such an angle that the launching will be down stream instead of diagonally across. Their lines are very fine, and at a glance they look more like two mammoth yachts than like merchant steamships. Their dimensions are: Length over all, 625 feet; breadth, 65 feet; depth, 41 feet, and nearly 13,000 tonnage measurement. Compared with the *Majestic* and *Teutonic*, they are 20 feet longer and 7 feet broader. The bottoms of the steamers are not quite flat, but are slightly rounded. The bows run up into what appears to be a topgallant fore-castle, which will show a considerable "flam" to throw the sea off when the huge ships are driven at full speed in head seas. The stems of both are plumb and the sterns are elliptical in form. They are constructed with double water-tight bottoms, into the compartments of which sea-water can be pumped for ballast. In addition, a false bottom runs fore and aft the whole length of the steamers. The false bottom is ten feet above the keelson, and rests on bulkheads which form a series of tanks, which will be used for holding fresh or salt water as required, giving additional security in case of accident.

The *Lucania* and *Campania* have two smokestacks and four masts each. The raking masts add to the yacht-like aspect. The smokestacks are each 26 feet in diameter. To give an idea of their size, about 25 persons sat down to lunch one day in one of the sections of the smokestack while it was lying in the Fairfield yards.

The engines are said to be the most powerful and perfect pieces of machinery of their kind ever constructed. They are of the triple-expansion type, of at least 50 per cent more indicated horse-power than the *White Star Line* steamers. They have twin screws, each screw worked by an independent set of engines. They will develop at least 25,000-horse power, which is generated by steam from 13 boilers heated by 100 furnaces. Each set of engines is to have three cranks, with five cylinders, namely, one high and one low pressure on the forward crank working tandem, one intermediate pressure on the middle crank and one high and one low pressure on the after crank. It is hoped that the speed will range from 22 to 22½ knots per hour, which will mean a minimum passage of about five days and four hours across the Atlantic. The arrangements for the twin screws are to be on the bracket system, as on the City of Paris.

Each vessel will accommodate 450 first-cabin passengers, 250 second-cabin and 600 steerage. The saloon of each ship will be unique. All of the 450 cabin passengers may sit down at one table. The saloon will be ten feet in height, or two feet higher than that of the *Etruria*, and will be 50 per cent larger than the *Etruria's* saloon. It will be finished in mahogany, with the ceiling paneled in white and gold and studded with electric globes. A stained-glass dome rises from the center of the saloon to a height of 25 feet from the floor.

The drawing-room is on the promenade deck and is finished in satin wood. Farther aft on the same deck is the library and reading-room with walls and ceiling of mahogany, a handsome, curled, mottled wood, and mahogany. The fittings, like the interior decorations of the ships, will be different from any other steamship afloat.

A. J. Macginnis, an engineer, recently said in a paper on "Transatlantic Steamships," read at a meeting of the Liverpool Engineer Society: "In 1878 the *Britannic*, to make a 7 days 11 hours eastward passage, indicated 5100-horse power and consumed 100 tons of coal a day. In 1887 the *Etruria*, to make a 6 days 2 hours outward passage, indicated 13,500-horse power and consumed 320 tons per day. In 1889 the *City of Paris*, to make a 5 days 19 hours out-

ward passage, indicated 18,000-horse power and consumed 300 tons per day. In 1891 the *Teutonic*, to make 5 days 16½ hours outward passage, indicated 17,000-horse power and consumed 300 tons per day. The new *Cunarder*, to make a 5 days 4 hours outward passage, will indicate 26,000-horse power and will consume 410 tons of coal a day.

"It will thus be seen that to gain two and a half days on the passage, it will be necessary to multiply the horse-power by five, and the daily consumption of coal by four, notwithstanding that at least 25 per cent more efficiency is gained from the fuel by the adoption of the triple-expansion engines."

Displacement of Laborers in Steel-Making.

An intimation of the extent and magnitude of the displacement of physical labor by the invention of machinery is obtained by the perusal of an interview with John Coyle of Homestead, who recently visited Chicago in the interest of the men now accused of various unlawful acts in connection with, and growing out of the strike of last July. The interview was printed in a Chicago paper, which makes Mr. Coyle say:

"Iron was formerly brought to the mills as pig iron. Under the new inventions it will be sent in a molten state. Each department handling the pig iron formerly included four piumen, four chargers, two shovelers, two helpers, ladleman and helper, steel-melter, weighmaster and two unloaders of ore from cars. There were two shifts daily, and eight of these furnaces in each department. The work of each furnace under the new machinery will be done by five men—a melter, helper, ladleman and two pitmen. This renders 148 men idle.

"In the converting mill, where metal is converted into Bessemer steel, men work eight hours a day—three shifts. There are 20 wheelers of metal to each shift, five cinder "snappers" or pullers and 20 carts and drivers, all rendered idle, for machinery will do all this hereafter. These men are crowded out by machinery. The setting of the moulds in place, formerly done by six men, will hereafter be watched after by a boy and a machine."

"In the 28 inch blooming mill, by the introduction of a hydraulic press for the pulling of ingots out on tables, 15 men will be rendered idle.

"On the rolls where steel is rolled to any shape desired, a machine called a 'go-devil' will replace 20 men.

"In the old beam mill one-third of the number of men will be enabled to do more work in five hours with the new machinery than the full force formerly could do in 12 hours. This will replace 200 men, known as chargers, heaters, hot-bedmen, helpers and shearmen. All the details are thoroughly done by the machinery.

"In the new beam mill, machinery improvements will be introduced in what is known as the 'open hearth,' which will do the most intricate work, and will displace 40 men.

"New machines will be introduced for unloading metal from the cars and laying it on the charger in the furnace. This will throw out 25 men. In small structural work, such as angles, channels and bars, scores will be thrown out of work by ingenious machinery. In the ten-inch mills a few will be out of work.

"In the armor plate, and in the 110-inch mills and the small plate mills, intricate machinery will be introduced this year that will displace many men. There is not a branch of the steel making industry which will not see machinery crowd out scores of manual laborers this year. Some of the machinery is said to be the most ingenious ever constructed. It will effect results in the making of steel that no one would have believed possible of manufacture, except the most skilled mechanic."

The Illinois Steel Company is also introducing labor-saving devices that will displace 500 manual laborers.

MOTTLED IRON.—A process of mottling iron, recently brought to notice, is as follows: The iron parts to be case-hardened are brightly polished, care being taken to remove all grease. They are then placed in an iron box, and covered either with bone-dust or old leather that has been burned. The box is then placed in a brisk fire and allowed to remain about one hour or until no doubt remains that all parts of the iron are heated to redness. The contents of the box are then dumped quickly into water. This operation requires great care, as the air must not strike the iron before it reaches the water. Special apparatus and practice are necessary to give the iron the desirable blue-gray mottled color, for if the air touch the iron it assumes a black or blue-black

streaked hue accordingly as the experiment is more or less imperfect. After the case-hardened iron is cooled, it is varnished, and the operation is complete.

Scientific Progress.

Cloud Classification.

Capt. David Wilson Barker writes to *Science* as follows:

For some years meteorologists have been in doubt as to the nomenclature of clouds, greatly to the retardment of this important and practical branch of the science. The nomenclature of Luke Howard answered very well for a time, but with our advanced knowledge it scarcely answers at all. It is not simple enough for beginners, nor elaborate enough for those well advanced. Many of the systems proposed lately are simply modifications of this old nomenclature, and retain its faults. Unfortunately, in cloud classification, we are met with many difficulties at the outset; we cannot collect and label clouds in a cabinet for reference, but here photography may aid us much. From personal experience, it has been found quite possible to portray even the most delicate and fleecy clouds with sufficient accuracy to leave no doubt as to their type. It is proposed in this article to lay before the readers of *Science* a simple scheme of cloud nomenclature suitable for beginners and those unable to devote much time to the study. On this simple scheme can be founded a more elaborate system for skilled nephologists.

It will soon strike any one who notices weather phenomena ever so casually, that clouds have a tendency to assume one of two well-known forms or shapes, either a heavy or globular form, or that of thin sheets or layers. Clouds in the first form are known as cumulus (cumulus, a heap) clouds. In the second as stratus (stratus, a layer) clouds. Once it is clearly understood that all clouds be divided into these two types as a starting-point, and belong to one or other of these types, the question of a minute subdivision becomes, comparatively speaking, easy.

It may be well to give here a cloud definition. A cloud is vapor, which has ascended or descended in the atmosphere from a position having a temperature or density greater than the portion of the atmosphere it ascends or descends to, which is then unable to retain it in its invisible form. According to the physical state of the position it is attracted to, so will be the form it will assume on becoming condensed. It will be seen from this that the shape of a cloud is more or less determined by its physical surroundings, and consequently it affords a valuable index, not only to the state of the immediately surrounding atmosphere, but also to the weather we may expect, and this frequently some time before any instrumental warnings are indicated.

Cumulus is essentially the cloud of the lower atmosphere, as, although it sometimes tops to great altitudes, yet its formation commences at a comparatively speaking, low level. Cumulus clouds assume varied and fantastic shapes, and vary very often from clouds of enormous extent to small nubecules; still, there is in them a distinct and marked similarity, which must be easily recognized. There are three forms of cumulus clouds from which rain falls, viz.: 1. Bold, massive cumulus with feathery tops, which appear to be composed of ice crystals, and are like the high variety of stratus known as cirrus. 2. Bold, massive cumulus with all clearly defined borders, only seen in the tropics. 3. Fleecy, ill-defined cumulus. The first may be accompanied by either snow, hail or rain, with a decided increase of wind, and, in fact, is a squall, which often gives warning hours before it reaches the observer. In the second is heavy rain with little increase of wind force, and, at sea, is the kind of cloud which sometimes accompanies waterspouts; and the last has only drizzling rain with no increase in wind force.

Stratus is formed in all layers of the atmosphere. On the ground it is fog, in the lower atmosphere as covering the sky often-times for days in anti-cyclonic areas; in the middle layers in broken-up or more or less circular patches, constantly though erroneously called cirro-cumulus or cumulo-cirrus, and in the highest layers as the well known cirrus or curl-cloud. It is a cloud of the finest settled weather, and also of the front of cyclonic disturbances, but there can be no mistaking these two conditions. In the former case it forms a pall over the whole sky, perhaps broken here and there by a rift, through which a blue sky, quite free from other clouds, may be seen, and appearing in all directions in lines parallel to the horizon. The first sign of any change is preceded by the disappearance of this cloud,

and the formation of fine threads of cirrus over the sky; these threads gradually grow closer and closer together until the sun or moon shines through surrounded by a halo. As the cloud grows thicker (seems to grow in the air), this too disappears, rain begins to fall, and a cyclonic disturbance is well under way. In the first case, the stratus was in the form of a cloud of great superficial extent and small depth; in the second, it has great depth and uniformity of texture.

Cloud-observing is a difficult branch of meteorology, yet no great advances can be made in the physics of the atmosphere until we have a better knowledge of its movements, and this article is written in the hope that those interested in the subject may not be appalled by the apparently hopeless condition of cloud nomenclature. For if we could have a series of observations taken carefully on even this simple basis, they would be of more value than the majority of observations taken now; and this especially applies to observations at sea, as it is to the sea we must look for the most valuable meteorological observations. Personal experience has shown that observers, while finding it comparatively easy to distinguish between cumuloform clouds and stratiform clouds and the different altitudes at which they float, yet often make great mistakes when they have to deal with the subdivisions as they are at present determined.

Metallic Chromium Obtained by an Electrolytic Process.

In a recent number of *Comptes Rendus*, Mr. E. Placet describes a new electrolytic process, by which he has succeeded in obtaining pure metallic chromium, which has formerly been but a laboratory curiosity, and in some cases was not pure chromium at all, but merely a more or less pure carburet of that metal.

To an aqueous solution of chromalum he adds an alkaline sulphate and a little sulphuric or other acid. In electrolyzing this solution beautifully brilliant deposits of pure chromium are formed on the negative electrode. Its properties are as follows: It is very hard, has a bluish-white color, resists atmospheric action, and is attacked only by concentrated nitric or sulphuric acid and concentrated solutions of potash. He said that this process may be applied on a commercial scale, which, if true, represents a very important step, as the alloys of chromium, notably those with iron and steel, are becoming of great importance.

He also states that he has succeeded in electroplating brass, bronze, copper and iron with desirable thickness of an adherent deposit of chromium resembling oxidized silver. At the time of reading his paper before the Académie he showed specimens of pure metallic chromium weighing over two pounds, and also samples of chromium alloys and brass ornaments electroplated with chromium.

BISMUTH.—At a recent meeting of the Royal Society, London, Mr. Edward Matthey, F. C. S., Assoc. Roy. Sch. Mines, read a paper on "Further Researches in Connection with the Metallurgy of Bismuth." In melting large quantities of bismuth containing arsenic it was found that on the surface of the metal being exposed to the air arsenical fumes appeared, and that as the temperature of the metal was raised the arsenic came off in dense white fumes (As₂O₃). An alloy of bismuth containing 0.65 per cent of arsenic was carefully operated upon and freed from the whole of its arsenic contents, the temperatures being noted at which the separation takes place. When raised to a temperature of 513° C. and maintained at this for a short period, the bismuth was found to be absolutely free from arsenic. Whilst engaged in fusing some 400 or 500 kilogrammes of bismuth containing antimony it was noticed that a peculiar oily film formed on the surface of the alloy, which on being removed and tested was found to contain a considerable percentage of antimony. By continuing the operation and removing the film from time to time as it formed, the melted metal became bright, and was then found to be perfectly free from antimony. A quantity of about 350 kilogrammes of bismuth containing 0.80 per cent of antimony was melted and the temperature observed at which the antimony separated as described. By maintaining a constant temperature at 458° C. the whole of the antimony separated, leaving the bismuth free from any trace of this metal. The temperatures were determined by the pyrometer of Mons. H. le Chatelier.

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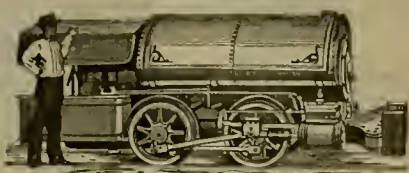
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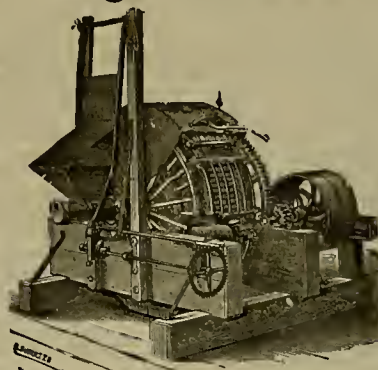
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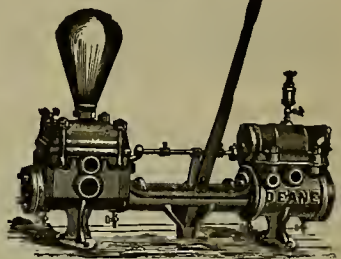
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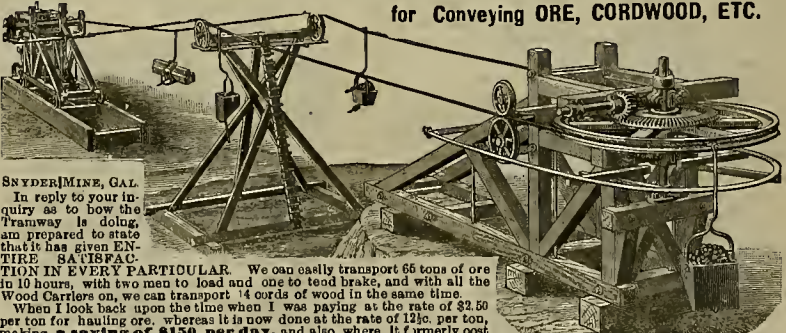


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Electricity.

Thermal Storage.

In the course of the first of his series of Howard lectures at the Society of Arts in London recently, Professor Unwin made the first public mention of a very important invention known for some time to a few, and likely to have a bearing on the economic generation of electricity, whether in large or small installations. It is the invention of Mr. Druitt Halpin, and, according to the *Engineer*, consists in the storage of the continuous thermal work of one or a small number of boilers to do the work of several or a large number of boilers for short periods. That is to say, that he meets the difficulties which bring about a low load factor, and with an ordinary load diagram he is able to meet the varied demand on the part of engines and generators with a uniform or straight-line load diagram as concerns the boilers. His system is one which is equally applicable for continuous and for alternating current stations, and in many cases it will make secondary batteries unnecessary except in very small numbers. At the present time it is necessary in electric generating stations to provide sufficient boiler power to meet the maximum demand or the highest part of the load diagram. This only, even if we make its mean, represents about one-sixth to one-fourth of the 24 hours; yet boilers must be provided, and fires either lighted up or banked up to meet this short period, the boilers themselves being sufficient to meet the maximum demand continuously. This not only enormously increases the fuel consumption, but it makes capital expenditure high and the unit cost of current very much higher than if produced with boilers always working at full load. To avoid these difficulties and losses, Mr. Halpin, under this thermal storage system, employs boiler power of about one-sixth to one-fourth the maximum load.

These boilers he works continuously at their best and most economical rate of evaporation. During those of the 24 hours when the generating station demand is small, the thermal work of these boilers is stored by passing the water which they heat into a sufficient number of plain storage tanks, protected from loss by radiation or conduction. The boilers which he employs will work at a pressure of, say 250 pounds on the square inch, and will be what we may call flooded boilers; that is to say, there will be no steam space within them. The storage tanks will, of course, also be worked at this pressure, but by very well-known arrangements steam will be taken from them when the engines are working at a pressure of, say 130 pounds. During the time of maximum load the water level in these tanks will fall by conversion of heated water into steam, and the level will again be made up during the fall to minimum demand.

The storage tanks will be the equivalent of the gas-holders in a gas-supply system, and in number will be sufficient to give a capacity of about 14 pounds of water per pound of steam required during the period of demand which is above the mean load. The estimated cost of this arrangement is less than that for a sufficient number of boilers, and a saving on the present cost of steam production in some of the well-known generating stations will, it is said, probably be from 40 to 50 per cent, so great is the loss of fuel during the time when boilers are under fire with closed stop-valves.

Mr. Halpin's system has never been employed in electric work, but the enormous cost of fuel per electric unit under existing circumstances, as compared with the easily practically possible 2½-pounds of coal per unit, shows how much it is wanted and how completely it has escaped all previous inventors, yet the principle upon which it is based is old, and has received various applications. It is another of that important class of inventions which employs old means in new combinations and applications to the public benefit.

ELECTRIC FURNACE.—A new furnace described in the London *Engineer* consists of two bricks of quicklime, one upon the other, the lower one of which is provided with a longitudinal groove, which carries the two electrodes, and between them is a small cavity, serving as a crucible, which contains a layer of several centimetres of the substance to be experimented upon. The latter may also be contained in a small carbon crucible. The highest temperature worked with was 3000 degrees C., produced by a current of 450 amperes and 70 volts, consuming 50 h. p. In the neighborhood of 2500 degrees, lime, strontia and magnesia crystallized in a few minutes. At 3000 de-

grees the quicklime composing the furnace began to run like water. At the same temperature the carbon rapidly reduced the oxide of calcium to the metallic state. The oxides of nickel, cobalt, manganese and chromium were reduced in a few seconds at 2500 degrees, and a button of uranium, weighing 120 grains, was obtained from the oxide in ten minutes at 3000 degrees.

Measurement of Light.

A beam of light has two other qualities besides that of illuminating a dark surface. It can be shown to possess more or less heat rays; also, that if certain compound substances are interposed in its path, chemical decomposition takes place. It is pointed out by the *Electrical Engineer* that were the three portions of the beam, viz., the thermal, the luminous, and the actinic or the chemical rays always united in the same proportions, we should have no difficulty in constructing a photometer accurate in its measurements and independent of the want of sensitiveness in the eye; for we could on the one hand use a thermometer, or a thermopile and a delicate galvanometer; or on the other hand a piece of sensitized paper such as is used in photography. But unfortunately the proportions vary considerably.

Tyndall has ascertained, as the result of a long series of carefully performed experiments, that the luminous rays from several sources of light bear but a small proportion to the obscure or non-luminous rays, the exact proportion of the former being, from

An oil flame.....	3	per cent.
A gas flame.....	4	"
A white-hot spiral.....	4.6	"
An electric-arc light.....	10	"

The arc light appears here as the richest in luminous rays; it is also the richest in actinic rays, but the poorest in thermal rays. The various proportions differ, however, to some extent with different carbons, etc. The experiments demonstrate that, if either the thermal or the actinic rays are to be utilized for ascertaining the luminosity of electric lamps, they can only be compared together, or among themselves; they cannot fairly be compared with an oil or gas flame.

ELECTRICITY AND FIRES.—Quite a change is noticeable of late in the attitude of insurance companies toward electrical interests. While the underwriters are not less vigilant in their efforts to keep up a high standard of construction, they do not display the opposition to electric lighting that formerly marked their policy. This can only be explained by the fact that they are beginning to realize the advantages of the electric light over other forms of illumination in the matter of safety. They are certainly justified in this change of policy if statistics have any value. Official reports of chiefs of fire departments in 82 cities of this country, having a population of 20,000 or over, show that during the year 1891 there were 18,118 fires from all causes, only 225 of which were attributed to electric lighting and power circuits. A comparison of the losses is equally interesting. The total value of property destroyed in all the fires reported was \$21,357,539.95, while only \$216,899.75 could be charged to the fires caused by electric currents. This is certainly an excellent showing and one that will appeal to every business man. It has always been claimed by the advocates of electric light and heat that with proper construction the fire risk would be reduced to a minimum where electricity was employed. And now they are supported in this position by official statistics, compiled from reports prepared by disinterested persons.—Western Electrician.

FUSING ALUMINA.—The process used at the aluminum factory in Neuhausen, Switzerland, is described by Mr. Wedding as follows: "Pure alumina is fused and then decomposed by an electric current. The vessel in which this takes place consists of an iron box lined with charcoal, forming the negative terminal. The positive terminal is formed of a number of carbon rods, placed vertically and extending into the box. At the start, small pieces of copper are used and are fused by the current, after which alumina is added and the aluminum is run off into molds as fast as produced. In making bronze, the ingredients are all added in this vessel. The capacity of the plant is given as about one ton of pure aluminum per day.

A FIRM in Budapest, Hungary, makes lamps in which the filament has three layers, only the core of which is made of carbon. The filament is immersed in a solution of 25 to 30 per cent of water glass, 10 to 15 per cent of Senegal gum and 12 to 13 per cent caustic soda. After immersion, it is given its proper shape. The filaments are heated in a bath of paraffin or naphthalin. The

layer of silicate is said to be conducting, and is claimed to protect them during the process of carbonization.

Useful Information.

What Constitutes Good Vulcanized India Rubber?

An investigation has recently been conducted by Lieut. L. Vladimiroff, at the St. Petersburg Technical Institute, with a view to establishing rules or tests whereby the quality of vulcanized India rubber may be efficiently judged. It is a notorious fact that no method of chemical analysis gives reliable results for this substance. Hence, the tests applied were chiefly of a physical nature. From a lengthy series of experiments the following conclusions were deduced, namely:

1. India rubber should not give the least sign of superficial cracking when bent to an angle of 180° after five hours of exposure in a closed air bath to a temperature of 125° Centigrade. The test pieces should be six centimeters thick.

2. Rubber that does not contain more than half its weight of metallic oxides should stretch to five times its length without breaking.

3. Caoutchouc, free from all foreign matter except the sulphur used in vulcanizing it, should stretch at least seven times its length before rupture.

4. The extension measured immediately after rupture has taken place should not exceed 12 per cent of the original length of the test piece of rubber. The test piece should be from three to twelve millimeters long, three centimeters wide, and not more than six millimeters thick.

5. Softness may be determined by measuring the percentage of ash formed on incineration; it may form the basis for deciding between different grades of rubber for certain purposes.

6. The vulcanized rubber should not harden under the influence of cold temperature.

These conclusions are to serve in the establishment of rules governing the introduction of vulcanized rubber in the Russian navy.—The Electrician.

COMPOUND LOCOMOTIVES.—At a recent meeting of the German Association of Engineers, the chief of the locomotive department of the Prussian State Railway stated that the trials of the compound locomotive by the Prussian Government indicate the superiority of the compound over the simple system in the following points: Greater total amount of work performed, increased economy in the use of fuels, reduction in spark-throwing. At the International Railway Congress at St. Petersburg, the French engineers were not unanimous on the subject. The representatives of the French State Railways and of the Paris and Lyons Company asserted as their opinion that hitherto tests have practically shown that in countries where coal is cheap, the changing of ordinary into compound locomotives, or the building, at the outset, of compound locomotives, is not likely to lead to any advantage. Where coal, however, is dear, the building of new compounds, and the rebuilding of old single engines to work on the compound system, and the adoption of higher steam pressure, are advisable. With the two-cylinder compounds at least, it has been found that there is no increase in cost for oil, maintenance, etc., as compared with ordinary locomotives. Statistics were given, showing that the number of compound locomotives in use has been increased in less than three years from about 680 to 1858. The two-cylinder compound locomotives increased in number from 522 to 1731, the three-cylinder compounds from 99 to 108, and the four-cylinder engines from 59 to 379.

A New Rapid-Fire Gun.

A rapid-firing gun recently tested at New Haven by the Winchester Repeating Arms Company fired 900 shots a minute, says the *Age of Steel*.

It is the invention of Messrs. Browning Bros., of Ogden, U. T. The only gun approaching this rapidity is the Maxim machine gun, with a record of 750 shots per minute. The new besom of destruction has a water-jacket surrounding the barrel holding one gallon of water. This amount of water is evaporated in one minute when the gun is in operation. In experiments made without the water-jacket the barrel would become too hot for safety in less than half a minute. The ammunition is fed into the breech from a continuous web belt holding the cartridges in pockets.

The representatives of the Krupp, Arm-

strong and Canet guns have been engaged in a wordy tussle upon the respective killing capacities of these weapons. The initial velocity of the largest of these projectiles is now well beyond half a mile per second, and the penetrating energy varies from 200 to 300 foot-tons per pound of powder, with a momentum of about 80,000 foot-tons. That is to say, a mass of steel can now be hurled forth with a destructive power something like that of the average railway collision, but with what ultimate benefit to the human race it is not so easy to determine.

Canet claims to produce the same amount of damage as Krupp or Armstrong at half the money and with greater simplicity and elegance. This French gun has been adopted by the Japanese Government for three coast-guard vessels. That brave, though diminutive, people find it the only weapon which one of their naval officers can handle alone. There is no wedge for closing the breach, as in the Krupp gun, which requires considerable biceps. The opening lever is so facilitated by screw manipulation that under normal power pressures one man can easily work it in ten seconds.

PREPARATION OF VERMILION.—The *Rev. de Chimie Industrielle* describes the following process: In a wooden bath one meter in diameter and two meters high are placed circular shelves about six inches wide on which is placed metallic mercury about one-half inch deep. These shelves are connected with the negative pole of the dynamo. At the bottom of the vat is a plate of steel-plated copper connected with the negative pole. The solution contains eight per cent of nitrate of ammonia and eight per cent of nitrate of soda. Through a perforated worm placed in the bath sulphuretted hydrogen is introduced. Besides this, the bath contains agitators. On passing the current a precipitate of sulphide of mercury, that is, vermilion, is formed. Another method which is being tried is to use a bath containing 100 liters of water, four kilograms each of nitrate of ammonia, nitrate of soda, sulphide of sodium and sulphur. In this case one has only to add sulphur and mercury instead of sulphuretted hydrogen.

A PASSENGER STEAMER for the Fall River line on Long Island sound is being built at the Roach shipyards at Chester, Pa. This steamer is to be 440 feet long over all, 52½ feet beam, 93 feet wide over the guards, 20½ feet depth of hold, 12½ feet draft and 4500 tons displacement. Each of the double inclined engines will have cylinders 51 inches and 95 inches diameter, with 11 feet stroke. The side wheels will be of the feathering type, 35 feet in diameter and 14 feet face. The vessel will be 20 feet longer than the Fall River line steamer Puritan, the largest boat now running on the sound.

ON A BIG SCALE.—The timber used in the construction of the Chicago exhibition buildings is estimated to exceed 75,000,000 feet, which represents the wood from ten square miles of forest. All the buildings are covered with a composition of plaster, cement and hemp, and the amount of this work is equal to covering the wall of a four-story building 15 miles in length. The electric lighting will require 5000 arc and 93,000 incandescent lamps, which is about ten times as much electric lighting as the Paris Exposition was provided with.

FROM 1846 to 1860 the total number of patents granted was 26,234, an average of 1874 a year for the period. Last year the Patent Office granted 21,427 patents to American citizens, nearly as many as were granted in the whole period from 1846 to 1860.

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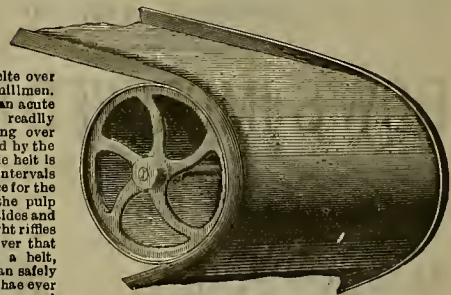
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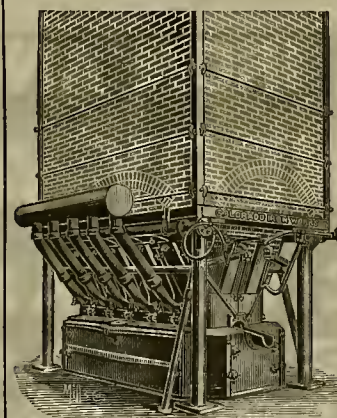
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We are now having our new Improved
Concentrating Belt manufactured in San
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Belts suitable for the Triumph and Frue
machines, but can make any length or
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any others will be readily seen by practical millmen.
First, the flanges or edges of our belt stand at an acute
angle inclining toward the center, and therefore readily
conform to the change of direction while passing over
the end rollers; thus the vibration and loss caused by the
frequent breaking of the flanges of the old style belt is
practically done away with. Again, our belts, at intervals
of two to four feet, have a very slight rifled surface for the
space of three inches, which tends to equalize the pulp
on the belt, and prevents it from banking on the sides and
forming channels through the center. These slight riffling
also save very fine sulphurets and the quicksilver that
would otherwise escape with the tailings from a belt,
the surface of which is entirely smooth. We can safely
say that it is a better concentrator belt than has ever
been manufactured. It will last much longer and
will handle more pulp. We also manufacture smooth belts with same flanges when desired.

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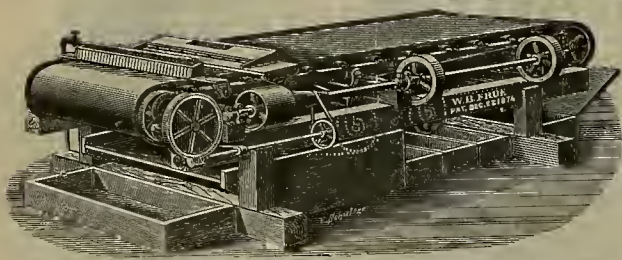
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A sufficient lap of hoop renders it unnecessary to rivet the hoop. It will fit the circle of any tank, regardless of size.
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MANUFACTURERS OF MINING AND WATER TANKS.
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OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



Price of 4-foot wide Plain Belt Frue Vanner.....\$550, f. o. b.
 " " Improved Belt Frue Vanner 800, f. o. b.
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OLADSTONE MINING COMPANY, C. J. Clark, M. E. Oen'l Supt. FRENCH OULCH, Calaveras Co., Cal., Dec 12, 1891.
 MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for Twenty Months. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.
 C. J. CLARK, Oen'l Supt.

For any information, or for pamphlets, or for circulars or testimonials, call on or address

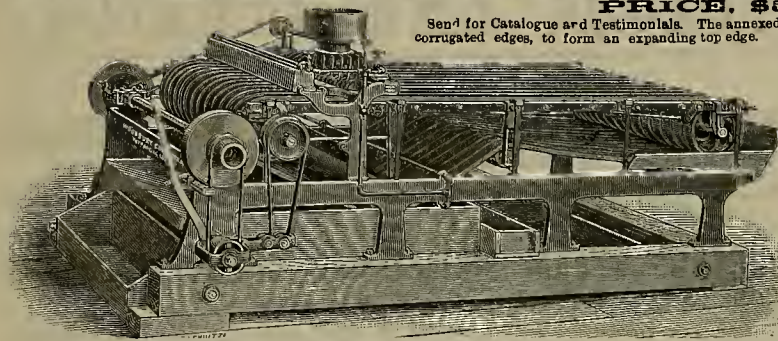
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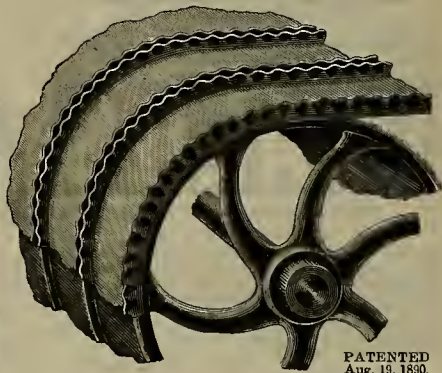
PRICE, \$575, f. o. b.

Send for Catalogue and Testimonials. The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge.



THE SAN JACINTO ESTATE—Office of the General Manager. CALIFORNIA, Oct. 30, 1891.
 GEO. E. WOODBURY, Esq.—Dear Sir: In reply to yours of the 27th inst. respecting the working and efficiency of the "Woodbury" Concentrator placed in our works by you, I am pleased to inform you that it is giving entire satisfaction; it has a much greater capacity than any other machine, and is doing fully one-third more work, with the concentrates equally clean, as from either of the machines it work here.
 (Copy) Yours faithfully, S. HARRIS, Manager.
 THE SAN JACINTO ESTATE, LIMITED—Office of General Representative, P. O. address, South Riverside, San Bernardino County.

CALIFORNIA, February 17th, 1892.
 GEO. E. WOODBURY.—Your letter of inquiry about your concentrator came to hand in due course. Your machine is doing well, the motion is all right, and the machine is giving entire satisfaction. Yours faithfully
 S. HARRIS.



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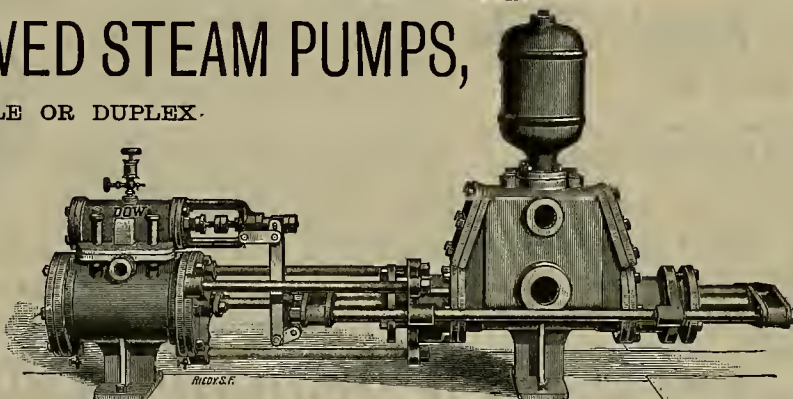
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Sole Canadian Representatives and Manufacturers.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

HECTOR.—*Amador Record*, March 2: At the Hector mine the water is down to the top of the 900 station. It is expected to have the water drawn from, and men at work in, the 900 level next week. This is indeed good news. At the South Eu-ka mine the work of sinking progresses favorably, the average being about 20 feet a week. By Saturday night they will be 80 feet below the 500 level. At this rate of sinking, the 800 level will be reached about June 1st.

WILDMAN.—Foreman S. C. Higgins, of the Wildman mine, informs the *Record* that they are down to the 1100 level and will have the pump sunk and be ready to begin drifting on that level by the end of the present week. During the period of sinking from the 900 level the stations at the two levels below have been cut out and everything made ready for active explorations on the new levels. At present, but little, if anything, will be done on the 1000 level except to run a drift far enough to make a reservoir for the use of the big pump, which is to be lowered from the 900 level to that point. The surplus water from the lower level will be hoisted by the smaller pump to the reservoir above. A drift will be started at the 1100 level and be run on the gong for 40 feet to the south. At the latter point a crosscut will be made in a westerly direction to strike the ledge. The mill and everything connected therewith has been thoroughly overhauled. A new water-wheel has been put in place, and the stamps will be in readiness to drop by the time the new level is opened out. All the old bands, who were temporarily laid off during the sinking, will soon be working on full time. This means a good deal in a business way to Sutter Creek. Supt. John Tregloan has gone to San Francisco, but is expected home Saturday. The *Record* mentioned a couple of weeks ago that Supt. Tregloan had received several anonymous letters finding fault with the working of his mine. It now transpires that these letters were mostly made up of underhand attacks against Foreman Higgins and others of the most trusted employees of the Wildman mine. Of course, only a coward would adopt this backbiting method of getting even for fancied wrongs. Foreman Higgins, who is the particular target for these slanderous attacks, is an old resident of Amador county. Years ago he was night foreman in the Plymouth Consolidated when that mine was in its glory. For five years past he has been head millman or underground foreman at the Wildman under Supt. Tregloan. In each position he has fulfilled every duty and enjoyed the confidence of his employers, both as a miner of excellent judgment and as a man worthy of their respect. The same can be said regarding the other mine-workers, whom this nighthawk has endeavored to slander.

Butte.

MAGALIE NOTES.—*Oroville Mercury*, March 4: Henry Wylie, of Magalie, was in Oroville yesterday and paid the *Mercury* office a visit. He reports a revival in mining interests in that section. The Alki mine, under the management of Mr. Perry, is running pumps night and day reducing the water in the shaft. The old famous Coal claim is being extensively developed by a tunnel in about 400 feet. Chas. Bader is working in a gravel mine with good prospects. The Oro Fino is also being marked with excellent prospects. The Black Leg mine has been bonded to capitalists and early workings are promised. The Mineral Slide, S. P. Moody superintendent, has been started up again, and, it is reported, is turning out good pay. In fact, Mr. Wylie says mining prospects were never brighter on the ridge than at present.

Calaveras.

MINING ENTERPRISE.—*Calaveras Citizen*, March 4: A company is being formed in town to employ prospectors to explore a piece of mining ground near town. The expenses will be provided for by assessments not to be above a certain pro rata. In this way a good deal of prospecting can be done and the expense divided, as no one will be very heavily assessed. This is a good plan to prospect known mineral ground.

MURPHY NOTES.—*Calaveras Citizen*, March 4: T. R. Garnier, manager of the O. K. mines west of town, has let a contract to John Canyon and Frank Collier. The distance to be run is 100 feet at \$2.50 per foot. The O. K. mine is situated near the Beatrice, in the same mineral belt. The mine was formerly owned by J. S. Sublet. Flattering reports come in from the Stanislaus district. It is said that while J. S. Sublet, the veteran prospector, was recently cutting a new road to the Sublet mine, he unearthed a lode about six inches in width that prospects a thousand dollars a ton. The extent of the lode and its richness is at present unknown of course, as it is yet wholly undeveloped. S. O. Carley is still peering away at the Louise mine at Grapevine gulch. The rock remains of its old-time richness and permanence is manifested. It is rumored the work will soon be resumed upon the old Calaveras mine at Indian Creek. Who the parties are at the helm and what they contemplate doing is as yet not known. N. Berrow is taking out fair prospects at the Three Tree mine near town—a recent discovery.

WEST POINT.—The Blazing Star is still pumping. D. H. Lee & Co. have a good prospect near town. The Riverside is still idle, with very little prospect of starting. The Lone Star works about 50 men, and the 20-stamp mill is kept running night and day. The Scorpion mine is being opened by a San Francisco com-

pany, under the management of Mr. M. Denison of this place. Sinking has already commenced, and rumor has it that a rich ledge has been struck.

El Dorado.

MILL MOVED.—*Georgetown Gazette*, March 3: The mill, hoisting works and other machinery of the old Clipper mine have been hauled to Spanish Dry Diggings, to be set up, we understand, on the French Hill mine, owned by a Sacramento company.

Nevada.

A RICH STRIKE.—*Transcript*, Mar. 3: John Hussey of Yon Bet came to town yesterday and brought with him a magnificent specimen of gold-bearing quartz, which was taken from his tunnel on the north fork of Steep Hollow, a half-mile south of the Big Tunnel and about six miles from the town of Washington. The specimen is literally filled with chunks of the brightest, cleanest-looking virgin gold we have ever seen. A prettier specimen was never found anywhere. The gold sticks out in horns from the rock, and in one place there is a perfect fern leaf of gold nearly two inches long and five-sixteenths of an inch wide, the veins of the leaf showing as plainly as though outlined by an expert jeweler. It is estimated that the specimen contains over \$100 in gold, but as a specimen it is worth much more. Mr. Hussey says he thinks nearly \$100 worth of gold was broken off in getting this piece loose. The World's Fair Committee should purchase it and have it sent to Chicago for exhibition. Mr. Hussey and his son have for some time been running a tunnel in search of a deposit similar to that of the famous Spanish mine in Washington township, and the striking of the rich rock was a great surprise. The croppings of a quartz ledge may be traced some distance in the vicinity of their tunnel, and it was in a spur from this main ledge that the rich quartz was obtained. Two or three carloads of fine rock, nearly all of it showing free gold, were taken out, and then operations were temporarily suspended. We expect to hear of further developments before long, and hope the rich streak will continue on and into the main ledge, which is about 40 feet from where the strike was made.

TO WORK TAILINGS.—*Herald*, Mar. 3: C. F. Burns and F. D. Gould are the names of two San Francisco gentlemen who have come here with a new and simple process of working tailings from quartz mills, and their scheme is to put in their plant on Deer creek, near White's ranch, and work over the tailings from the Providence, Champion and Mountaineer mines. They will pay the mine-owners a stated price per stamp for the exclusive right to work the tailings from their mills, and have fair prospects of making something out of them. The Chinese have heretofore had a monopoly of such mining here, and they make it pay, even by the laborious process of cradle and rocker.

WORK GOING ON AT THE CHAMPION.—*Herald*, Mar. 3: The extensive surface improvements at the Champion mine are nearing completion, and, when finished, the Champion will have one of the finest plants in the county. The new hoisting works is a large building, about 34x100 feet in size, and has been built right over the old building without interfering with the work. It is some 30 feet higher than the old building, and the cars will be run out at a sufficient elevation to do away with the present hauling of rock at the ore-bins in the mill. It is a substantial building, and the gallow's frame in it is calculated to stand till the incline is down another thousand feet. A massive granite wall, four feet thick, is being built between the new works and the road, and it will be high and strong enough to protect the hoisting works from any caving of the steep bank, or any flood of water that is likely to come down and fill up the shaft. When it is finished, Superintendent Zeitler will feel that both his property and his miners are comparatively safe. The number of cars coming up from the incline is something astonishing. By a system of chutes in the incline, a car can be loaded in ten seconds by the watch, and they are hoisted and lowered without intermission. Seventy-five tons of ore are hoisted every day, besides the waste dirt. This keeps 30 stamps and 11 concentrators running. The mill is a model of excellence, and under the management of Superintendent Davis. When the new rock wall is completed, the road will be widened and a machine and repair shop built alongside the hoisting works. The company is now employing 120 men.

Mono.

COMBINATION TUNNEL.—*Bodie Miner*, March 4: D. E. Jones, superintendent of the Combination tunnel, Jordan, passed through town Wednesday en route to Ohio. His mission is ostensibly to attend to some family business, but it is said his trip will have an important bearing on mining operations at Jordan. Some of the owners of the Combination tunnel live in Ohio and it is surmised that Mr. Jones goes to consult with them relative to the resumption and prosecution of work at Jordan. It is known that a large body of rich ore is there, and should the hopes and anticipations of many practical mining men who are not accustomed to dwell upon improbabilities be realized, Mono county will leap to the front as the leading bullion-producing section of the country.

MONO.—During the past week east crosscut from main south drift, 550-foot level, was extended 15 feet. West crosscut from same drift was extended 18 feet. There were employed four miners and one carman.

BONIE CON.—During the past week east crosscut, 550-foot level, was extended six feet. Upraise, 400-foot level, was extended eight feet. Upraise, 300-foot level, was extended 11 feet. West crosscut, 200-foot level, Lent shaft, was extended 16 feet. There were employed six miners, one carman, and, jointly with Mono,

one engineer, one blacksmith, one watchman and one foreman.

San Diego.

JULIAN.—*Sentinel*, March 3: This camp, like many others, has had its ups and downs. For a year past it has been experiencing one of the downs—in fact, it has been clear down to hedrock in mining enterprise. In this case, hedrock means the Bailey Bros. of Banner and a few resident miners, who, in the 22 years past, have always remained at their posts, and, by their untiring energy, grit and faith encouraged others, and brought a revival in mining circles. The outlook for a revival of the proper kind is surely encouraging. Mining men are casting about for gold properties, and Julian will get her share of those who are real miners, not boomers; and when she gets them, the merit of this mineral belt will hold them. They are already beginning to arrive, and invest, and there are more on the way. We expect to see several good mines change hands and be put in operation before the summer is over.

Shasta.

LOWER SPRINGS MINES.—*Cor. Shasta Courier*, March 4: The Gipsy mine is being worked both day and night, a force of eight men, including the cook, being employed there. Mr. McTimmons informs me their shaft is down 50 feet, up to February 26th. The timbering or cribbing of the shaft is kept close up with the sinking in order to secure the shaft. The water is quite easily managed. The ledge is large and carries an abundance of sulphurets. The slime from the vein is supposed to be valuable, and preparations will soon be made for a thorough test. Connors' group of mines is pushed ahead as fast as possible. They are working three men by day only. Connors informed me his cross tunnel is in 130 feet, up to February 26th. No perceptible change is noticed in the breast of the tunnel. There is a group of ledges upon this property by which six pay shoots have been discovered since his management upon the place. Mr. Connors thinks it will take the larger portion of this year to demonstrate the merit of these deposits, but is sanguine of stirring up a little boom in that vicinity this summer. Deakin & Taylor's mines are under consideration I presume, as no word has been received as to the consummation of the bond, but it is evident that work upon the veins will soon be commenced if this company does start to work, as there is no reason to doubt it will be a step in the right place. Then the wheel of progress will start rolling all around this camp.

POCKET.—*Shasta Courier*, March 4: Wm. W. Engram struck a rich pocket at the Engram and Wright claim near Shasta, and from February 1st to February 27th he panned out \$1433 in gold. The claim is on Rock creek, a mile below the road crossing and about the same distance northeast of here. On February 23rd, Engram panned out three pens of dirt, and from one got \$219, from another \$90, and \$243 from the other, a total of \$552 from the three pens. One piece he took out weighed \$103, one \$137.50 and another \$30. A number of pockets have been taken out in that section, but Engram's best strike is the best that has been made for some time. About four men are employed at the Hidden Treasures on Iron mountain, below the Lost Confidence. They had some very rich ore on top, but nothing very favorable has been discovered in the lower tunnel, which is in the hill 140 feet, and looks "blue" so far as the prospect for good ore is concerned. Howkett and Anderson are employing four or five men on their mine, formerly the Vandever and Billard claim, on Flat creek, and keep their Huntington mill in motion. Isidore Krause, of this place, has sold his mine on Flat creek to Hans Christensen. The McMahon reduction works at South Fork, near Tgo, were to have started up this week, and it will not be long before E. Ballou will have his reduction works completed and in operation. Lorenz Garrecht and Frank Cunningham own and are working the New Years mine, a very promising location, situated near Hightown, about two miles northeast of Shasta. They are down about 30 feet, and the ledge at the bottom of the shaft is between three and four feet wide. The ore from the shaft and croppings assays very satisfactorily to the owners.

OLD DIOGONS.—The Texas and Georgia mines have been sold to an English syndicate for a big price. The mine is no doubt one of the best paying mines in the State. Mr. Hart has his 20-stamp mill running day and night, and has plenty of good ore in sight to keep the mill going for many months. Mr. Hart let a contract lately for another tunnel, 150 feet lower than the present works. This shows that Mr. Hart has faith in his mine. Mr. Cheyney, the banker of Philadelphia, made the final payment on the Mammoth mine last week to Garrecht, Panter and Yung. Mr. Morton, the able superintendent of this mine, has made several strikes the last month or two. He has followed the ore chute from the upper tunnel to the lower one, a depth of 175 feet. He runs a crosscut north and south, and it shows up fine in every place. The new company has not decided yet what it will do, but we should not be surprised to see another 30 or 40-stamp mill along the river before many months. The Walker Bros' mine is coming to the front also. Mr. Rippetto, the superintendent, has had a force of men working for nearly two years, running a deep tunnel. A few days ago he struck a well-defined vein. The tests Mr. Rippetto has made with the ore are very satisfactory, and he feels jubilant over it. The Reid Consolidated has resumed work again on its mines. The company had to stop work on its Spanish shaft, as it could not keep the water out of it. Mr. Stevenson, the manager of the mine, informs us that he will erect steam hoisting works in the near future. Frank Panter has stopped operations temporarily on his mine (Donkey). He has left for San Francisco on some mining

business, but will resume work again after his return. It is only a question of time when Old Diggings will be the liveliest mining camp in California. All the experts and mining men predict that Old Diggings will be a second Comstock.

Siskiyou.

A BETTER SYSTEM.—*Yreka Journal*, March 8: The American Bar Co., near Ash creek, Klamath river, consisting of Portland capitalists, are putting in extensive works on a new and better system than any river claims in this county now possess. The water-wheel will be 40 feet, occupying nearly the full width of the river, and is 18 feet in diameter, with an estimated capacity of 250-horse power, which will run all the machinery used, including two derricks, each capable of lifting seven tons, a centrifugal pump with a pressure of 250 feet for pumping out claim and filling sluices, besides other machinery. The gravel is raised by the elevator process from hedrock, the derricks being used only for raising boulders, lowering timber and such kind of work. The water-wheel is automatic, and will raise or lower with the stream, either a foot or six feet if necessary. The derrick masts have no gnyropes, being braced at the foot, and the boom, resting against the foot of the mast, is pulled up like a fish-pole, dropping the boulder where desired, just as a fisherman lands a fish.

SALMON RIVER.—The prospects for a prosperous season in the Salmon River section never looked better, affording great encouragement to miners. Several new fields of great value have lately been discovered, and the heavy quantity of snow on the mountains, with the ground thoroughly saturated from frequent storms, will furnish a good supply of water until late in the season, both for mill-power and gold-washing purposes.

Tuolumne.

AROUND BUCHANAN.—*Cor. Union Democrat*, March 4: The Garfield Virginia Mining Development Company are pushing their main tunnel head very rapidly, on a vein of gold milling ore. The operations of this company are under the immediate superintendency of Mr. A. C. Maier, and are viewed with favor by prominent mining men of this section, inasmuch as the main tunnel is going into one of the finest mineral belts of the State. It cannot help, by proper management and the expenditure of a small amount of capital but develop a first-class mining proposition. The Buchanan mill has been running steadily for the past month and we expect to hear of good results in the near future. Although your report of last week was not altogether correct, it is generally known here that some very good ore has been taken out.

SANTISIMO.—*Tuolumne Independent*, March 4: The Santisimo mine, on Jack's Hill, is being very vigorously worked at present by the new owners—Harriman, Oliver, Loftus, Gillis and Hawley—and in the near future we would not be surprised to learn that another bonanza had been discovered.

But two or three of the pocket mines in the neighborhood of Tuletown are able to be worked at present, on account of being filled up with water from the recent heavy rains. As soon as the surface water is drained off, active work will commence again and good strikes will then be in order.

MR. MEAN, who is mining the old Masonic building lot in Columbia, is rushing things lively and is seemingly prosperous, as pieces of coarse gold can be seen in the bank of gravel now being worked. We learn that the building will soon be taken down and removed to the Rewhide mine, the owners having purchased the bricks to erect chlorination works.

THE Bonanza's new machinery, which is operated by water-power, we believe, instead of steam, saves the company about \$3 per day on the expense account. They have been running on the dump or refuse for some time, and have been fortunate enough to make running expenses while getting things in order. They have begun on new ground, where it is expected that good results will follow.

NEVADA.

Washoe District.

CON. CAL & VA. MINE.—*Virginia Chronicle*, Mar. 4: 1500 level.—Have continued to extract ore and old fillings in working upward in the old south slopes, now on the 14th floor above the sill floor of this level. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stops, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stops in working north from the crosscut run west from the northwest drift. A north drift has been started and has been advanced 34 feet in a porphyry and quartz formation, which carries very low assay value. The winze started in this west crosscut, in old timbers, has been sunk 24 feet; total depth, 60 feet; in porphyry and quartz formation of very low assay value. Have extracted during the week from the 1500 level stopes and 1650 northwest drift openings and raised to the surface 561 cars of ore, about 550 tons. Shipped to Morgan mill 323 550-2000 tons of ore. Average assay value, per railroad car samples, \$23.52. The average assay value, per battery samples, of all ore worked at the mill during the week (970 tons) was \$26.06 per ton. Bullion shipped to Carson Mint, assay value \$27,446.50.

OPHIR.—1465 level.—Have completed the work of cutting out a chamber in the north lateral drift on the sill floor of this level, at the point where connection was made with this drift by the upraise which was carried up from a point 99 feet below on the north side of the crosscut run east from the drift run south from the Mexican into the Ophir ground. We are now placing hoisting machinery in this chamber,

and this work will be completed in the coming week.

MEXICAN.—On the 1465 level the drift run north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south line of the mine, has been advanced 6 feet; total length, 576 feet, continuing in a hard porphyry formation. From this north drift, at a point 510 feet in from its mouth, a west crosscut (No. 2) was started and has been advanced 17 feet in a porphyry formation showing clay separations.

URAN.—340 level.—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 21 feet; total length, 143 feet; continuing in porphyry, clay and quartz formation.

SIERRA NEVADA.—Are making necessary repairs to intermediate tunnel. The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 22 feet, making the total distance west of the joint shaft 2976 feet; the face is in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 22 feet, making the total distance west of the shaft 2976 feet; the face is in porphyry.

ANNAS.—On 420 level north drift from cast crosscut No. 1 north advanced 16 feet; total length, 131 feet. This drift is all in quartz.

BEST & BELCHER.—200 level.—West crosscut No. 1, started in northwest drift, 170 feet from our south line, has been extended 20 feet, passing through quartz giving low assays; total length 96 feet. 900 level.—West crosscut No. 3, from top of upraise No. 1, from 1000 level, has been extended 15 feet; total length 158 feet; face in porphyry, clay and stringers of quartz. Suro tunnel level.—The joint east crosscut with Gonid & Curry Company has been advanced 12 feet during the past week, passing through porphyry; total length, 42 feet.

GOON & CUAAY.—200 level.—During the past week, west crosscut No. 5 started in northwest drift, 432 feet from main west drift, has been advanced 20 feet; total length, 347 feet; face in porphyry. Suro tunnel level.—The joint east crosscut with Best & Belcher Company has been extended 12 feet; total length 42 feet; face in porphyry.

HALA & NOCAOOS.—We are putting in new guides in the south hoisting compartment of the main shaft. Main Incline.—We continue making the necessary repairs. 1400 level.—Are retimbering the main north drift on this level. 1800 level.—West crosscut No. 1 from the main south drift was advanced 19 feet; total length, 165 feet; face in porphyry. West crosscut No. 3 from main north drift was extended 10 feet; total length 382 feet. The face of this crosscut has reached the west wall. From the end of this (No. 3) west crosscut a north prospecting drift was started during the week and advanced 5 feet. The face of this drift is in quartz and porphyry. West crosscut No. 4 from main north drift was advanced 20 feet; total length 212 feet; face in porphyry.

MOULAA.—The north drift from the south line, 550 level, is out 234 feet; face is in quartz containing bunches of ore. We are repairing west drift, 450 level, and south drift, 750 level and retimbering the two north compartments of the main shaft above 930 level. Have started a crosscut east 260 feet south of north line, 930 level; face is in porphyry.

BULLION.—The west crosscut from the north-west drift, 300 feet south of north line, 1800 level of Ward shaft, is out 333 feet; face is in porphyry.

POTOSI.—The west crosscut from face of south drift, 30 feet back from face of east crosscut from the Potosi winze, 930 level, is out 16 feet; face is in clay and porphyry and some low-grade quartz. The north drift, 30 feet back from face of east crosscut opposite the Potosi winze, 930 level, is out 10 feet; face is in porphyry and streaks of quartz. The south drift from top of raise, 1000 level, is out 214 feet; face is in quartz and porphyry. The north drift from top of raise, 1000 level, is out 155 feet; following a streak of ore 16 inches wide, which assays from \$25 to \$30. The north lateral drift from the bottom of the Potosi winze, 1800 level Ward shaft, is out 95 feet; face is in quartz of low assay value. Extracted and sent to mill the past week 459 tons and 750 pounds of ore from the 550, 950 and 1150 levels. Milled during the week 400 tons; on hand at mill, 139 tons and 1750 pounds. Average battery assays, \$26.14. Average car sample assays, \$26.15. Shipped to U. S. Mint, Carson, 347 pounds of crude bullion.

APEX.—Last week we advanced the drift crosscut 15 feet and began sinking winze No. 1, which shows indications of a body of ore.

WAAN SHAFT.—The west crosscut from the northwest drift, 300 feet south of the Bullion north line, 1800 level, is out 333 feet; face is in porphyry. The north lateral drift from the bottom of the Potosi winze, 1800 level, is out 95 feet; face is in quartz of low assay value.

EXCHAQUAA.—No work has been done on the 1800 level of the Ward shaft during the past week.

ALPHA.—No work has been done on the 1800 level of the Ward shaft during the past week.

NEW YORK.—During the week we have been grading the winze below the 650 level. The west crosscut, from the southwest drift, 850 level, is out 74 feet; is in low-grade quartz and porphyry.

SILVER HILL.—The southeast drift, 450 level, has been advanced 5 feet, through hard porphyry; total distance from north line, 62 feet.

Central District.

IMPORTANT MINING SALA.—Silver State, March 1: An important mining deal was concluded here yesterday by the sale of the Blackbird mine in Central district to Detroit parties. The

consideration is reported to be \$18,000. The mine was formerly called the Aurum and was owned by Clark & Standing. It is one of the best-developed and richest gold mines in the county. The purchasers will at once commence active operations, and a mining boom in Central may be looked for in a short time.

Kennedy District.

ACTIVE OPERATIONS.—Cor. Silver State, March 1: All the mines are looking well in the district, and the boys are pushing their work as fast as possible. The Imperial mine, owned by Kennedy & Co., which is the most developed of any mine in the camp, is looking well. The main tunnel is in 250 feet and shows a strong ledge of good ore all the way. There is an incline down 50 feet from the bottom of this tunnel, showing a well-formed ledge of good size and good ore. The face of this tunnel is about 100 feet from the surface. Tunnel No. 2 is in 80 feet, which is 100 feet lower than No. 1 and shows a big ledge of good ore. They shipped two carloads that worked over \$800 to the car. They expect to have a shipment by the first or middle of March, from which they expect to realize as much or more than they did from their previous shipment. Lawler & Co.'s mine is looking well. They have a vein of ore from 8 to 12 inches thick that prospects well. Ed. Stone expects to have a carload from the Alice as soon as the roads are passable. Mark Wiggins is at work on the Kearsage, from which he is taking good rock. W. G. Wilkinson is running a crosscut to strike the ledges on his Union mine. He has encountered some very hard rock on the way. In running 75 feet he has cut several stringers that assay very well. He has about 50 feet farther to run to strike the main ledge. Wm. Barrett has struck some fine-looking sulphurets in the Crown Point. There are several other prospects in the camp that are looking well, and all they need is work to bring them to the front. All the camp wants is reduction works to make it one of the best in the State. We have a weekly mail, which is a great addition to the welfare of the camp. We have had a very pleasant winter, the mercury seldom reaching zero.

ARIZONA.

GOLD STRIKE.—Prescott Courier, March 3: A rich gold strike is reported on the east side of the Agua Fria, near the Boggs. The ledge has been traced a long distance by rich free-gold chimneys which crop out on the surface. The ledge is from 50 to 60 feet wide, has been run in on only nine feet and blocks of ore as large as an ordinary stove have been taken out literally covered with free gold, many of the pieces of gold being as large as an ordinary pea. The gold is bright, clean, yellow and very pretty. Two men, working 150 feet apart, are taking out this character of ore.

GOLD MINAS.—Prescott Courier, March 3: While some people hereabouts are, with good reason, bemoaning the sad fate of silver, as a matter of fact the unsatisfactory condition of the silver market has had more to do with bringing this section into notice than any other cause; for here lies the most extensive gold-mining belt known, and to its exploration and development have not only our local miners turned their attention, but mining capital driven out of silver sections to the north and east of us is finding its way here and going into gold properties. Now that the current of prospecting and capital has turned into this channel, not a week goes by without the finding of new gold properties in this mineral belt, all of them good—some of them veritable bonanzas. Every dollar driven from silver investments can be put into our great undeveloped gold belt, and that very class of capital is pouring in here at present and its volume will steadily increase. It is bringing to us true mining men, men from the mining States and territories to the north of us, men who have both the means and experience and conduct mining on purely business principles; who know mines when they see them, and who have pronounced this the greatest gold country known. The hazardous investment of money in mines by men who don't know a piece of quartz from a grindstone, is, as a rule, only a temporary benefit to any mining section, for these enterprises, with few exceptions, become stranded from sheer ignorance of the business, and the section gets a black eye. Such investors have done Arizona far more harm than good.

MONTANA.

AMONG THE LEDGES.—Butte Miner, March 2: As to the Anaconda properties, March 5th has been set as the time for a resumption of operations thereat, and no doubt the present intentions of the company to start on that date will be carried out. When the mines first closed down it was rumored that they would be started up again in a few days, but it was the intention, it is said, to remain closed until April 1st. However, matters have so shaped themselves that the expiration of the three months combine shut down will enable the company to again start up on the same old colossal scale and continue until the "fine dust" again clogs the wheels of operation. To start in, the shipments of ore will not be large, but they will increase gradually until the smelters are consuming their usual quantity. During the suspension, all the mines were placed in first-class condition, the shafts of several being deepened and retimbered. It is expected that within two weeks from next Sunday, which will be the day the button is to be pressed, fully 1000 men will be working in and about the company's properties. Besides these, the Montana Union road will give employment to many more. The news of the resumption was sent out by the company yesterday; yet, notwithstanding the fact that it was soon generally known, no great excitement resulted. This is no doubt due to the fact that, during the last few days, many men have been put to work at the syndicate properties, which was in itself pretty good

proof that a resumption was not far distant. Some of the old men have left the city since the suspension, but they will return when the news of starting up reaches them.

LEONARD SHAFT IMPROVEMENT.—A new stack is being erected to carry away the smoke from the furnace of two new steel boilers recently placed in position at the Leonard shaft of the Boston & Montana Co.'s Colusa properties. The stack will be 125 feet in height. The boilers are to have a pressure of 130 pounds, and are intended to hold steam for the large pumping engine which will shortly be placed at the 600-foot level of the Leonard shaft. A portion of the pumping machinery was shipped from Chicago on the 16th ult., and was due at the mine Saturday. The portions of the pumping machinery with which the water will come in contact are made of bronze and copper, which will preclude the possibility of further trouble from the corrosive water. The column pipes will also be copper. After the machinery is in position, the shaft will be deepened 400 feet.

THE RAMSDALL-PARROT.—The Ramsdall-Parrot mine is being worked in a small way by the owner. The ore is shipped to Denver for treatment. Although the workings are 500 or 600 feet in depth, the ore now being taken out comes from the 300, at which point the vein is quite large. It is said that F. August Heinze, the gentleman who owns a smelter at Meaderville, lately offered Mr. Ramsdall \$1000 per month for the privileges of working the property, but Mr. Heinze had a year's lease on the mine before he took the Estrella—a fact which led Mr. Ramsdall to decline the present proposition. In the lower workings of the Ramsdall the ore bodies are very large and rich, the ore from the rich streak, with one of which all the large copper veins of the district are supplied, containing much native silver. The Shakespear-Parrot and Bologna, both of which are located east of the Ramsdall, also belong to Mr. Ramsdall.

NEW MEXICO.

PIÑOS ALTOS.—Southwest Sentinel, March 3: New ore bins have just been put up at the Langston mine in the Piños Altos district, and Miller & Watson are shipping ore from the mine to the Bremen mill here, where it is being treated. There are no idle men at Piños Altos now, and the prospects of that camp are better than they have ever been before. The mills here and at Piños Altos are crushing about 150 tons of ore a day and this will be increased to 200 tons as soon as the Manhattan Company gets to taking out ore. No other camp in New Mexico can boast of mining operations carried on in such an extensive way. Prof. Waring says that the contact in Chloride Flat is precisely the same as that at the Mollie Gibson mine in Colorado. Perhaps a bonanza may yet be discovered almost within the city limits of Silver City. About 30 tons of ore are being shipped daily from Hanover. There is very little demand for iron now on account of the fact that none of the smelters in the Southwest are running to their full capacity. A carload of zinc ore was shipped from Hanover yesterday, and some other small shipments will be made soon. J. H. Broughaw is contemplating extensive operations there in the zinc mines in the near future, but the Mineral Point Zinc Company, which owns a number of claims in the district, will do no work of importance in its mines this year. A feasible route has been found from Hanover to the alum beds on the Gila river, and if a good route can be found from the Gila to the coal-fields it will not be long until the construction of a railroad from Hanover to the coal-fields will be commenced. Cheap coal for reducing the Hanover ores will mean a great deal to the miners of that district. The criminal cases against Robert Milliken, of the American Silver and Lead Company, have been dropped for the present. The company's property at Cook's peak has been closed down for the present, and work may not be resumed until late in the season. A large amount of money was due the miners at the time the company suspended operations.

OREGON.

PLACERS.—Jacksonville Times, March 3: Placer miners will do well this season, having a good supply of water. T. H. B. Taylor and sons of Pleasant creek are having a big run, with lots of water, and will doubtless make a nice cleanup in the spring. S. C. Lawrence has located an extension to the ledge discovered by D. Horn in Gall's creek district, which promises fully as well as the original discovery. John J. Neatbammer is utilizing the fine head of water he has at his mine on Saxe's creek, in the vicinity of Woodville, and expects to make a good showing when he cleans up. D. Horn, who found so rich a ledge in Gall's creek district recently, has sold it to a company composed of O. Ganiard, H. L. White and others. Four thousand dollars was the price paid, Horn retaining a number of sacks of rich ore he had already taken out. The new proprietors doubtless have a bonanza, and will work it to the fullest extent.

SOUTH DAKOTA.

D. & D. SMELTER.—Deadwood Pioneer, March 4: The D. & D. smelter, which has been closed down since Saturday night on account of the coke running out, is reducing the usual amount of ore again. The coke was not shipped through on regular time or there would have been no necessity of closing down. Dr. Carpenter stated to-day that the three extra stacks would be finished at an early date and would be blown in as soon as possible. As the amount now paid by the company for coke reaches \$100,000 per year, it can be readily seen that with all four stacks running the coke bill will be something enormous from now on.

RAPOATAN RICH STRIKE.—The recent discovery that Chicago park, a mile above the town of Pitkin, Colorado, is underlain for miles with mineral of high grade in workable distance of

the surface has caused an old-time mining boom. Shafts are being sunk all over the park. Some of the mineral runs as high as \$18,000 to the ton, and will average \$190. The character of the discovery is such that the Union Pacific railroad will immediately reopen the old Alpine tunnel. It has been closed several years and the Rio Grande Company will construct a branch from Parline to Pitkin for the purpose of securing the business in view. Cudaby, the Chicago pork man, is interested largely in the company.

GREENBACK WATER-RIGHT.—George Brettell, president and superintendent of the Greenback Mining and Milling Company, was in the city yesterday, and he stated that extensive development work would soon be commenced on the Spearfish water-right belonging to his company. The water is to be flumed so as to give three heavy falls within six miles from where it is first taken from the creek channel, and at each fall a plant will be put in for the purpose of generating electricity. Mr. Brettell will leave for the East in a few days to purchase machinery to be used at the first fall, and the company will erect another plant or two as soon as the power can be disposed of at a reasonable figure. It is the intention of the company to use a part of its power to run a stamp mill, which it will erect somewhere in this vicinity, for the milling of ore which will be taken from the Greenback mine at Lead.

HARDING-BAKER PROPERTY.—It is now given out that the Harding-Baker Company will resume development work on its mining claims at Two Bit within the next six weeks. There is already an 85-foot shaft on the property and it is stated that it will be sunk to the next contact. Besides this, a first-class drill has been ordered and it will be kept busy on the different claims during the entire summer. It is known that vertical veins of galena and carbonate rock exist in that region and that the ore is usually high grade. If the company should strike some of these veins, it would not only result in making the owners wealthy, but it would mean the extensive development of all property in that vicinity.

The Bucyrus Steam Shovel and Dredge Company.

The new works of the Bucyrus Steam Shovel and Dredge Company at South Milwaukee, Wis., are about ready for occupancy and expect to start up in about a week. This plant will be the finest in the country of its kind, and for its size, will be the best to be found anywhere.

Owing to the large business done by the Company, the works at Bucyrus have been decidedly cramped for some time. The change to be made will give ample accommodation. The new location is in every way a most advantageous one for the conduction of a business such as that in which the Bucyrus Steam Shovel and Dredge Company is engaged, and there will be plenty of room to increase the capacity of the works when this again becomes desirable.

Regarding business done during the past year, the Company writes:

"We have never been so full of work as at the present time; we have over \$200,000 worth of unfilled orders on our books, and more coming in constantly."

The patent improved placer mining outfits, which the Bucyrus Steam Shovel and Dredge Company has been introducing during the past three years, have proved very successful. It has a number of these plants in successful operation, and is making several others on orders. The Fortunas Mining and Milling Company, of Albany, has just ordered a second plant, after testing to its satisfaction the one which it bought last year.

THE PRESS is in receipt of Volume X of the *Advertiser Reporter* issued by the Publishers' Commercial Union, whose main office is at Chicago. The *Advertiser Reporter* is a work invaluable to newspapers and other publications. Its purpose is to give a complete and accurate directory of all the general advertisers in the United States, with the financial rating and worth of each. In other words, the design is to assist publishers in learning as to the reliability and credit of all persons, outside their local surroundings and with whom they may be unacquainted, desiring to advertise in their columns. It will at once be seen that a work of wide scope and great delicacy is thus undertaken. The Publishers' Union appears to have discharged its task with special credit and conscientiousness. Previous volumes have been compiled with care, as many publishers can attest, and Volume X is even above the usual high standard.

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Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

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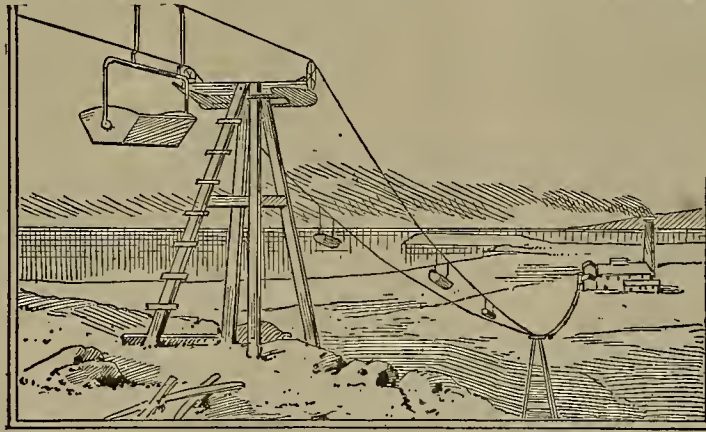
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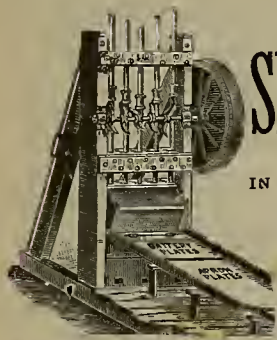
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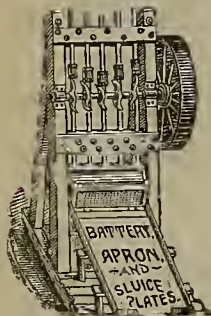
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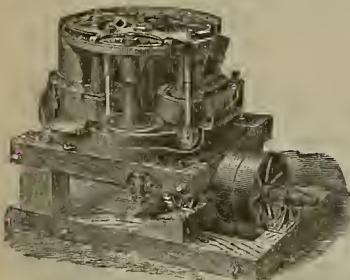
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The Robinson Riffle.

In a recent number of the MINING AND SCIENTIFIC PRESS (Feb. 24), was published a description of the Robinson riffle as used in the cyanide process plant in Shasta county. Mr. George K. Fischer, M. E., of Denver, Colo., seeing the article, sends us some drawings which we here reproduce, and describes certain improvements in the riffle, as follows:

"The MacArthur - Forest Company in Denver has experimented with the Robinson riffle and other forms for the purpose of reclaiming the coarser gold from the pulp after passing through the cyanide process. It may be of interest to briefly describe the result of their efforts and the form of box finally adopted. The mill was running upon gold ore from Dakota consisting of sulphide, graphite, and manganese, with 85 per cent silica. The extraction by the cyanide process was 85 per cent of the assay value of the gold. The panning of the tailings showed 10 to 12 colors per pan, the gold grains being perfectly clear and bright by the action of the cyanide. The Robinson riffle constructed as described in your article was then introduced below the sluice. In a short time the pulp commenced to accumulate at the foot of each riffle (Fig. 1—B), and before long the mercury, shown by letter A, was covered with a deposit of sulphides, etc., which rendered it entirely useless. Various grades or inclines for the box were tried, with no better success. The banking was due to the heavy sulphurets, a large proportion of coarse clean-up from the battery and the irregular flow of water and pulp. The velocity of the water necessary to carry the pulp down was such that the stream in dropping from one riffle to another overflowed, as shown in Fig. 1, though perhaps this result was somewhat magnified by the fact that the riffles were not as long as described in your article.

"A new form of riffle (Fig. 2) was then introduced (with the inclinations as shown in the sketch), with the following results: The water and pulp shot down the inclined 'C' with considerable force, throwing the heavy particles onto the mercury. The only accumulation then took place at B, while the mercury remained clear and bright. During the run the tailings were constantly panned at the end of the sluice and showed no color. The box consisted of 23

riffles, 12 inches wide and 12 inches long, and nearly all the gold was caught in the first half of the box."

ONE of the most important mining deals in the history

Electric Tramways in the Country Districts.

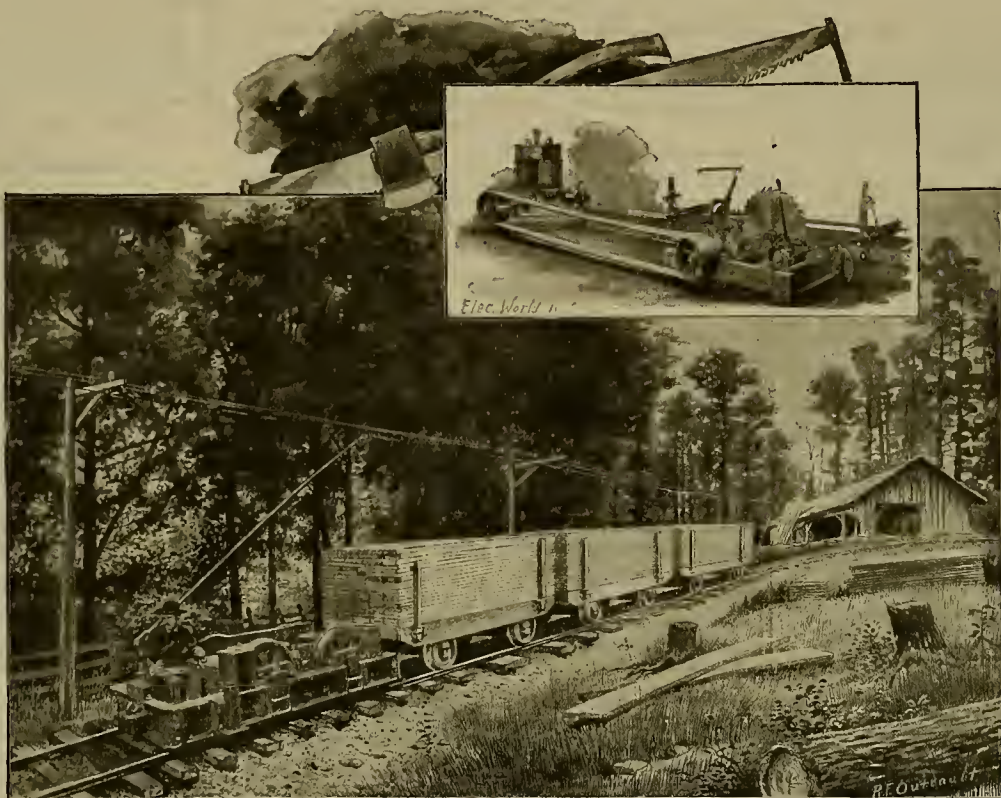
Attention is gradually being directed toward electric tramways in country districts, not only for conveyance of passengers, but for produce, freight, etc. As feeders to steam roads already established, they would be very useful indeed. At several places they have already been established. These roads cost much less to build, equip and maintain than steam railroads, and in many places water power can be used for generating the electricity. In addition to its service as a line of transportation, a line of this sort may furnish to farms along its line whatever power is necessary for stationary machines. Our illustration (for which we are indebted to the *Electrical World*) shows an electric road in a country district utilized for the transportation of lumber from the sawmill in the vicinity. In this case, electricity also furnishes the power for the operation of the sawmill, a work which, of course, is not unusual for the electric motor. A number of instances where electricity is used for the operation of sawmills have been described and illustrated in our columns, the most striking of which was probably that in use on

the World's Fair grounds at Chicago, where no less than 11 different sawmill plants were in use, driven from current supplied from a single central station. In Oregon and Washington several electric roads have been built into timbered regions, and are used not only for hauling lumber, but for passengers and freight.

THE Alaska Treadwell mine mined and worked 120,000 tons of ore at a total cost of \$1.32 per ton. The mining was 65 cents; milling and concentration 33 cents, and chlorination of 2703 tons of sulphurets 19 cents per ton, or \$8.42 per ton of sulphurets. General mine expenses were eight cents and expenses in San Francisco two cents per ton. Bullion freight and insurance amounted to five cents per ton.

THERE is said to be 25 feet of snow on the Henry Mountains, Utah, and prospectors can do nothing there for some time.

AMERICAN CAPITALISTS from Kansas City are buying asphaltum deposits in the State of Tamaulipas, Mexico. Valuable mineral and oil deposits have been found in Southern Mexico. Some of the higher grades make an excellent lubricant.



A COUNTRY ELECTRIC TRAMWAY, SHOWING SOME OF ITS USES.

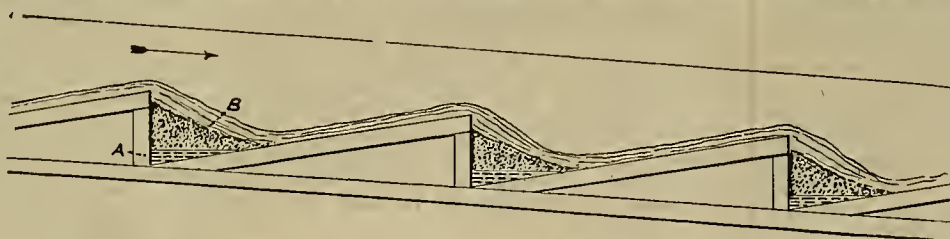


FIG. 1.—THE ROBINSON RIFFLE.

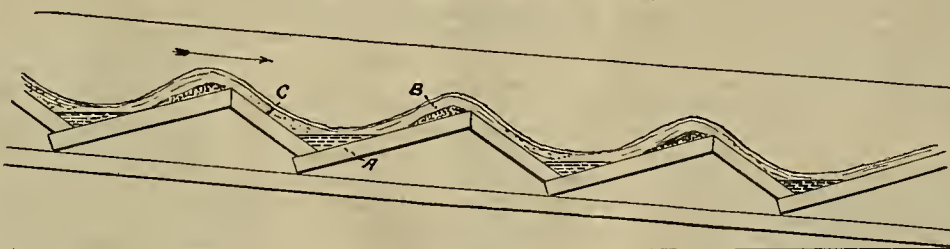


FIG. 2.—THE NEW FORM OF RIFFLE USED AT DENVER.

erty is situated at Kelly, in the Magdalena mining district, Socorro county. Patterson Brothers have worked the property for two years, and it has yielded \$140,000 in silver carbonates.

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W. B. EWER, } EDITORS
CHAS. G. YALE, }

Our latest forms go to press on Thursday evening.

Entered at the P. O. Postoffice as Second-Class Mail Matter.

San Francisco, March 18, 1893.

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Comment.

Certain Sacramento officials and other valley anti-debris men, who opposed the passage of Senator Ford's bill defining hydraulic mining, and permitting it to be carried on in California where doing no material damage to navigable streams or adjacent lands, have asked a hearing before the Governor, in order to induce him to veto the bill which passed both Houses. This the Governor has granted, but he at the same time gives representatives of the mining industry an opportunity to be heard in advocacy of the bill. This bill was very fully discussed and considered by both the committees and bodies of Senate and Assembly, and passed with very large majorities. It only proposes to permit hydraulic mining where no material injury is done, which is now permitted under recent court decisions, and the Caminetti law just passed by Congress. The object of Senator Ford's bill is to put on the code only what the law now permits. It is right in line with U. S. Court decisions and an Act of Congress. But the anti-debris people persist in carrying on their old fight to the last breath, notwithstanding the courts, Congress and public opinion are against them. They fear this will give the miner some right he does not now possess, or some right over which they can have no control. It is a simple act of justice to the mining community for the Governor to sign this bill, which gives the miner no new rights, but puts on legal record those already accorded to him. There never was any law or Act of Congress prohibiting hydraulic mining, but the court decisions were to the effect that it could not be carried on where inflicting injury to streams or lands. This is the case to-day, and only those mines are permitted to run which have shown they are able to impound the debris. Senator Ford's bill amends the code, by adding a paragraph that such mines as can run without material damage to streams or lands shall be permitted to do so. It gives no permission to break the laws, and conveys no new privileges. This being the case it should become the law, and the anti-debris people should have refrained from continuing their factious opposition.

Sacramento obtained its prestige and standing by being the distributing point of supplies for the rich mining regions of this State in the early days. Every one went to the mines in those times, and to get to the mines they had to go to Sacramento. The southern counties had no population to speak of, aside from the Mexicans, though the northern counties were filled with bustling Americans seeking for gold. So Sacramento naturally became the capital of the State, as San Francisco was the natural metropolis. The city on the river was made by the mines and the miners, and its original wealth came from those

sources. Yet for 10 or 15 years that city has been the center of opposition to mines and mining in California, notwithstanding much of the supplies are still purchased there. The citizens have contributed largely to suppress hydraulic mining, the supervisors have organized against it, and its newspapers never have a friendly word for the mining industry, but, on the contrary, attack it on every occasion. The city has forgotten all former obligations to the mining industry, and has been aggressively against it. Sacramento is now, however, put on the defensive to save itself. The Legislature has decided to submit to the people the question of moving the capitol to San Jose. In the discussion of the subject, a strong feeling of antipathy to Sacramento has become manifest. Some of the assaults are doubtless unmerited, and statements untrue, but it is nevertheless apparent that there is a general feeling of unfriendliness to Sacramento. The main objections to moving the capitol are based on the cost rather than to a desire to see Sacramento favored. That city has been selfish in that it has constantly looked to itself rather than the general benefit of the State. It has fought the miners at every step. Even when popular opinion and the laws are favorable to the rehabilitation of the mining industry, when it can be done without injury to streams or lands, the Sacramento men continue to oppose it. They oppose it blindly and on general principles. The miners do not ask to be permitted to cause further injury, but they do ask that they may be allowed to get out their gold if they can show it can be done without injury to other interests. Sacramento does not even want them to try the experiment. It cannot expect any friendly feeling from the northern mining counties. It cannot expect support from them. When the question of removal of the capitol comes to be voted on, Sacramento will regret the extreme course it has pursued with relation to the mining interests. It has been unreasonable in enforcing its demands, looking at but one side of the question, and has made more enemies than friends.

We used to value the stored snow in the Sierra every winter with relation to mining operations during the summer months. The gradual melting of the snow keeps the streams fed in summer, and as the quantity of water available bears a relation to the output of gold, the question of more or less snowfall is an important one in California. In these days the snowfall is more considered in connection with agricultural operations. Irrigation has become so universal in the valleys that a good supply of water is essential to bountiful crops. The snows of the Sierra constitute the principal source of irrigation supply. There is now an abundant quantity on the mountains, and unless warm weather comes on suddenly it will last far into the summer. This is good for the miners, too, though not so important as when all our hydraulic mines were working. Good water seasons increase the gold output in all surface mining. With quartz mines the mills run by water-power keep all their stamps dropping and do not have to partly "hang up." The miners expect a good water season this year. Most of the hydraulic mines will not be able to take advantage of it since they have not built the necessary dams, but by next season many will doubtless be built.

The bill to appoint a State Debris Commission passed both houses of the Legislature on the last day of the session. It is not probable that any appointment will be made for some months, but already there are several applicants for the position. In this case a skilled mining engineer is required, and it is to be hoped that only a first-class man will be selected. He will have to consult with the U. S. Commissioners, and no one but an engineer of undoubted professional standing and experience should be chosen. "Political engineers" have no business in such positions, and unless the applicant can get the endorsement of the best men in the profession he should not be considered.

It has been decided to put up the new copper-smelting plant at Salt Lake. That city has given a bonus of \$100,000 and 160 acres of land, and \$600,000 will be invested in a smelter, wire works and electrochemical plant. The latter building will be of stone and of brick, and 1,000,000 feet of lumber will be used in its construction. An engine of 1000 horse-power will be used to run the machinery, which will be of the latest pattern, and the works, when completed, will rival the well-known Anaconda smelter. The copper mines in the southern part of Utah, will doubtless be opened up and developed when this plant is ready for operation. This is a very important thing for Salt Lake as it will bring ores to that place from a wide region.

Two more parties of prospectors have come back from the desert without finding the Peg Leg gold mine, for which so many have hunted. These men are of the opinion that no mineral exists in that portion of the desert east of the Carriso or San Jacinto mountains. This opin-

ion, however, will not deter other parties from going over the same ground. Lost mine romances are very attractive, and a certain class of prospectors seem to prefer hunting for legendary mines, instead of putting in time trying to discover new leads.

It will be remembered that last July there was a heavy explosion of 400,000 pounds of dynamite and 17,500 pounds of black powder at the Giant Powder Works across the bay at West Berkeley. As scores of plate-glass windows in this city were broken, the New York Plate Glass Co. sued the powder company for damages, a test case being set. These windows which were broken were 13 miles from the seat of the explosion. The powder company claimed that it was a pure accident, and there was no contributory negligence. Justice Barry in his decision says the company, while admitting the accident, contends that the words vicinity and proximity are not established by this case. As to the word proximity, the court held that distance was controlled by other elements, as, for instance, the amount of powder stored up. A large mass of explosive matter works damage at a greater distance and so reduces that distance for legal purposes. It had been contended for the defendants that if the powder works had been a nuisance they might have been enjoined, but the court held that this was a suit to recover for damages already sustained, and not to restrain impending damage. The fact that the destruction had been wrought demonstrated of itself that the nuisance existed, and it was not necessary to show that the explosion was attributable to the negligence of anybody.

The New Mining Bureau Law.

On the day before the Legislature adjourned it passed the bill for the government of the State Mining Bureau, and repealed all former acts concerning this institution. The new law provides for five unsalaried Trustees, who hold office for four years. They control all properties and funds of the Bureau and adopt rules and regulations for its government. The State Mineralogist must consult the Trustees on all matters pertaining to his official duties and he must perform them subject to the supervision and approval of the Trustees. The Mineralogist is given the right to appoint competent assistants and qualified specialists when necessary in the execution of his plans, and fix their compensation, but all such appointments and compensations are subject to the approval and confirmation of the Trustees, and shall not be effective unless so confirmed and approved.

The State Mineralogist must have "a practical and scientific knowledge of mining and mineralogy." He is appointed by the Governor for a term of four years, at a salary of \$250 per month, and his necessary traveling expenses when on official business. These expenses, however, must be first approved by the Trustees, and then audited by the State Board of Examiners. The duties of the State Mineralogist are thus expressed in the law:

It shall be the duty of said State Mineralogist to make, facilitate and encourage special studies of the mineral resources and mineral industries of the State. It shall be his duty: To collect statistics concerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic or commercial importance, such collection constituting the museum of the State Mining Bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the Library of the State Mining Bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this State, to consist of such collections and library, and to arrange, classify, catalogue and index the data therein contained, in a manner to make the information available to those desiring it, and to provide a custodian specially qualified to promote this purpose; to make a biennial report to the Board of Trustees of the Mining Bureau, setting forth the important results of his work, and to issue from time to time such bulletins as he may deem advisable, concerning the statistics and technology of the mineral industries of this State.

The duties of this official, as stated in the new law, are more carefully defined than formerly, and he is given permission to issue bulletins when advisable. The whole bureau, too, is made in effect a "Bureau of Information," such as was recently suggested in these columns, and the information now in the possession of the institution is to be so arranged and indexed as to be readily available to the public. The trouble has been in the past, to find ready at hand, what has been sought for on inquiry; or it has been necessary to find some certain individual who was in possession of the facts. Under this law, the collections, library, reports, etc., must be classified and catalogued, so that anyone may readily find what they want.

If the new Mineralogist, Mr. Crawford, systematically

carries out these instructions of the law, as he doubtless will, the State Mining Bureau will become a much more useful institution. The miners will give it more favor and give it more to do. They will be sure to keep it in mind when in need of information, and will also keep it in mind when it needs assistance at the hands of the Legislature. When they find it is being carried on for their benefit, and that each has a right to call upon it for information, they will use it more freely than in the past.

We are not informed what changes, if any, Mr. Crawford will make in the conduct of the Bureau; but the provisions of the new law will necessitate some departure from former methods, which will undoubtedly be to advantage of both the Bureau itself and the mining community. The institution has just passed a very critical period of its history, since it came near being abolished entirely by the Legislature, and bills were introduced to that end. Its friends, however, came to its assistance and it starts on renewed life with an appropriation of \$50,000 and a new man in charge. The Governor of the State showed a strong personal interest in the institution and was anxious to see it placed on a better footing so as to become more useful. We are of the opinion that it will be so conducted in the future that there will be no doubt as to its utility, and it will not be necessary to "lobby" for its support. Mr. Crawford the new State Mineralogist, who is from one of the old mining counties—El Dorado—is a Freiburg graduate, an intelligent and capable man, and one who is anxious to make the Bureau over which he presides, of the utmost practical use to the mining community.

A New Ore-Crushing and Grinding Pan.

Jas. H. Kinkead, the well-known mining superintendent of Virginia City, Nevada, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improvement in pans for grinding ore. The pan is made of iron and of any suitable diameter, having an essentially flat bottom and vertical sides united by a curve of a quarter of a circle. The interior of this pan is lined with dies properly secured and forming a removable surface upon which the grinding takes place. Through the center of the pan passes a shaft, which is geared to it, and the lower end fits into a socket step. The upper end of this shaft has a ball formed upon it, and this fits into a corresponding shaft socket or box upon the outer end of a crank. More or less throw can be given to this crank as desired. The crank is fixed to a vertical shaft journaled in a box upon the frame timbers. A beveled gear-wheel is fixed to this shaft, and a beveled pinion is fixed to the horizontal shaft journaled upon the frame timbers and having driving pulleys upon the outer end through which power is applied to rotate the shaft and crank and move the pan.

In order to prevent the pan itself from turning round, there is fixed upon the lower end a hub having teeth formed in its lower surface extending radially from the center toward the outside. A corresponding set of teeth is formed on the upper, outer surface of the step in which the lower end of the pan shaft is supported. The two serrated faces are curved to have a radius corresponding with the amount of throw that the crank gives the pan, so that the teeth in the two surfaces will travel in contact, and, while the pan is caused to revolve around the central step by the movement of the crank with which the upper end of the shaft is connected, it is prevented from rotating about its own center by means of these teeth.

Within the pan are placed balls of such size that their curvature corresponds with the inner curvature of the die which is fitted into the grooved angle of the pan. When the machine is set in operation, the pan, revolving round its step constantly, inclines so that each portion of the periphery of the pan becomes temporarily the lowest, and, at the opposite side of the rotation, the highest. This peculiar movement of the pan causes the ball or balls to roll round continuously in the interior, and, if the speed is considerable, a centrifugal motion is developed which greatly assists in the grinding action of the balls. By reason of the peculiar motion of the pan, the balls are continuously rolling down hill, and the least possible power is needed to keep the machine in operation. Around the upper periphery of the pan is fixed a screen, so that all the material, as fast as it is pulverized fine enough, will pass out through this screen and fall into the surrounding circular sluice or trough, which is arranged to catch the pulp as fast as it passes out through the screen. By this construction Mr. Kinkead believes he has a very effective and continuous grinding pan, into which the ore may be delivered regularly, and as regularly discharged through the screen when fine enough.

THE leaching plant put up at Silver Peak, Esmeralda county, Nev., by John Ohiatovich & Co., for the treatment of gold tailings by the cyanide process, is now in successful operation.

Geographical Society of the Pacific.

Volume III of the Transactions of the Geographical Society of the Pacific has been issued. In addition to the lists of officers and members it contains the following papers: "Some Facts about Weather and Storm Phenomena," by Lieut. J. P. Finley, U. S. A.; "The Discovery of San Diego Bay," by George Davidson; "Recent Visual and Photographic Astronomy," by Prof. E. E. Barnard; "The Eruption of the Volcano Weniainioof," by George Davidson; and "Cable Surveys," by Lieut. Commander Z. L. Tanner, U. S. N. There are several illustrations in the bulletin.

This Society was organized March 16, 1881, and has its office and library in Mercantile Library Building corner Van Ness Avenue and Golden Gate Avenue. Its objects are, to encourage geographical explorations and discovery; to investigate and disseminate geographical information by discussion, lectures and publications; to establish in this, the chief city of the Pacific States, for the benefit of commerce, navigation and the industrial and material interests of the Pacific Slope, a place where the means will be afforded of obtaining accurate information, not only of the countries bordering on the Pacific Ocean, but of every part of the habitable globe; to accumulate a library of the best books on geography, history and statistics; to make a collection of the most recent maps and charts—especially those which relate to the Pacific Coasts, the islands of the Pacific and the Pacific Ocean; and to enter into correspondence with scientific and learned societies whose objects include or sympathize with geography. The Society publishes a bulletin, which it interchanges with geographical and other scientific societies. Monthly meetings are held, at which original papers are read, or lectures given, and to which, as well as to the entertainments to distinguished travelers, to the conversations, and to the informal evenings, the members of the Society have the privilege of introducing their friends, in accordance with the provisions of the By-Laws.

The officers for the current year are: President, George Davidson, Ph. D. Sc. D.; vice-presidents, T. E. Slevin, LL.D., Justice Ralph C. Harrison, Rev. Robt. Mackenzie, D. D.; treasurer, Harry Durbrow; home corresponding secretary, Hon. Jeremiah Lynch; foreign corresponding secretary, P. W. Poulson, M. D.; recording secretary, John Partridge; assistant secretary, T. F. Trenor, M. A. Board of Directors—Thos. E. Slevin, John Partridge, Alfred S. Lowndes, Harry Durbrow, Louis L. Nelson, Capt. C. L. Taylor, Prof. George Davidson.

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This society has a large membership and is quite active. A great number of important papers have been read before it, as appears from the list printed in the *Bulletin*. The prospects are now brighter than ever, as its utility and authority in the field of scientific research are acknowledged. The increased numbers attending the meetings show the interest taken in scientific matters. During the year 1892 ten lectures were given, all very fully attended.

Underground Temperature.

In answer to a question as to the method of taking temperatures of rocks at different depths in mines, a description may be given of that adopted by Charles Forman in determining the temperatures in the Forman shaft some ten years ago. The temperatures were taken from the surface to a depth of 2300 feet. They were ascertained by drilling holes not less than three feet deep into the rock and inserting into the hole a Negretti and Timbra slow-acting thermometer of the pattern adopted by the Underground Temperature Committee of the British Association and standardized at Kew. These holes were closed with clay, and the thermometers were left in for 12 hours, not less than three holes being tried at each point. The following are the depths in feet and the temperatures in degrees Fahrenheit:

Feet.	Deg.	Feet.	Deg.
100	50½	1300	91½
200	55	1400	96½
300	62	1500	101
400	60	1600	103
500	68	1700	104½
600	71½	1800	105½
700	74½	1900	106
800	76½	2000	111
900	75	2100	119½
1000	81½	2200	116
1100	84	2300	121
1200	89½		

It may be stated that more accurate results might have been attained had the holes been filled with water, the thermometers put within a foot of the bottom, the holes then plugged, and the thermometers left for 12 hours. In the dry state the average heat of the rock is not so well

ascertained as it is when equalized by the water. However, the results would not differ very greatly. Of course, higher temperatures than this are experienced in certain drifts and close places in a deep mine, but it was the actual temperature of the rocks which was desired. In the record quoted, no mention is made of the varying characters of the rock itself.

Coast Industrial Notes.

A FIFTY-SIX-FOOT steamer, to be run by storage batteries, is being built at Tecome.

THE new electric railroad on Eighth street, Oakland, was put in operation on Saturday of last week.

UKIAH, Mendocino county, is considering a proposition to issue \$60,000 in bonds for a sewerage system.

THE Columbia river salmon canneries failed to complete their combination, and each will work for himself this season.

A SAN DIEGO paper says that a strong movement is under way at the head of the bay to start a co-operative beet-sugar industry.

THE Von Schmidt dredger is at work off the Sessions property in East Oakland, on the harbor contract originally let to John Heckett.

A SIX-STORY block, after the plan of the Mills Building, will shortly be erected on the old Hibernia Loan and Savings Society property, corner of Post and Montgomery streets.

STOCKTON capitalists are considering an electric power transmission scheme, by bringing the power of one of the mountain streams to operate a railroad between that city and Lodi.

UTAH's total gold output for 1891 was \$31,644; for 1892, \$31,926; showing an increase of \$282. The silver output for 1891 was 8,750,352 ounces; for 1892 it was 7,762,269; showing a decrease of 988,096 ounces.

THE new steam whaler Jeannette, Captain Newth, is the best appointed whaling vessel ever built in the United States. She was constructed at Turner's yard at Benicia, has a fine model, powerful engines and is well fitted out in every way.

NOTWITHSTANDING the shut down of the Harney Peak Co.'s tin properties in Dakota, the Deadwood Pioneer still believes that, with proper management, there are a number of tin mines in the Black Hills that will pay a reasonable interest on the investment.

THE California World's Fair Commission has appointed a committee to confer with C. F. Smurr of the Southern Pacific line, with a view to procuring reduced rates for California World's Fair employees, and for tourists wishing to visit this coast during the fair season.

ONE of the best-posted shingle-dealers in Washington State, after a careful computation, estimates that Western Washington will this year ship east 1,500,000,000 shingles, an increase over last year of over 50 per cent. This product will be worth in round numbers \$2,000,000.

THE Bureau of Statistics of the Treasury Department gives out the following statement of the value of exports of breadstuffs from Pacific coast districts for the month of February: Oregon, \$21,103; Puget Sound, Wash., \$401,132; San Francisco, \$2,138,976; Willamette, Or., \$384,416. Total, \$2,945,527.

A KEEL has been laid at the Oakland shipyards for a 150-ton wrecking steamer to be called the Whitelaw. It is to replace the wrecking steamer of the same name recently lost on the coast near Russian Landing. It will be under the ownership of T. P. H. Whitelaw, and will be launched within sixty days.

It has been finally decided to remove the Wentworth boot and shoe factory from Oakland to Santa Rosa. A subsidy has been given by the Santa Rosa people in order to secure the removal. It is the purpose to establish a tannery in connection with the factory. The loss will be considerably felt in West Oakland, as it will throw about seventy-five men out of employment.

BUSINESS has commenced picking up on the Central Pacific, and it is expected that the coming season will be the busiest the road has ever experienced. The number of crews on the Truckee division will probably be doubled within the next few months, which will be an era of prosperity for the railroad boys. Meister Mechanic Hunt of Wadsworth is getting the motive power of his division in first-class shape for hard work during the spring and summer months.

THE great Hemet dam, near San Jacinto, San Bernardino county, is finished to a height of 110 feet, and is filled with water to a height of ninety feet. The lake is nearly two miles long, the widest place being three-fourths of a mile, making a surface area of nearly 750 acres. It is now five weeks since the outlet was closed, and this enormous body of water has been collected in the last two weeks. There is enough water impounded to irrigate 20,000 acres during the coming dry season.

F. M. SMITH, a resident of East Oakland, who is familiarly known as the "Borax King," is increasing his factories. There are few borax factories in this State that he does not own. Last week, A. L. Tubbs, as assignee of the Harmony Borax Mining Company, the Meridian Borax Company and the California Chemical Company, conveyed to Smith the borax works on Alameda point. The deal was made some time ago. The same conveyance takes in a number of other borax factories in various parts of the State.

NEARLY 2000 feet of Mission street, between Silver and China avenues, have been dug up and graded for the road-bed of the new Mission-street electric road, and about 200 feet of track have been laid from the proposed terminus at China avenue in toward the ferry terminus. Over 100 men have been employed since the work of roadbuilding commenced, and the force was increased this week. The

stormy weather has interfered to some extent with the work of rail laying and grading, but as soon as it becomes clearer rapid work will be witnessed. Ties, rails, iron and other material are now being strewn along the line from the Five-mile House to the ferries.

THE Blue Lakes Water Company, in which several Oakland capitalists are interested, is slowly making progress. It is proposed to pipe water from Plumas county to Oakland, supplying cities and towns on the way. The directors held a meeting in San Francisco a couple of days ago and decided to issue bonds in the sum of \$5,000,000. There will be 5000 bonds of the value of \$1000 each. The bonds are to run for 45 years. The directors present at the meeting were T. G. Phelps, J. S. Emery, M. J. McDonald, Daniel E. Hayes, A. T. Hatch, F. M. Smith, L. G. Harvey, Henry L. Davis, Joseph Britton, C. S. Wright and R. Mc F. Doble.

The narrow-gauge road of the Towle Bros., which starts out from the main Central Pacific line at Towle's Station, has now reached a length of thirty miles, and at its terminus they are finishing in time for the opening of the lumber season, one of the largest and finest mills ever built in the Sierra Nevada mountains. It will have band saws and be run by water-power, and will have a capacity of from forty to fifty thousand feet in twelve hours. Last year the company run three mills, but by running this new mill day and night, they expect with it and one of the others, to turn out lumber enough to meet their demands. The new mill is located near Deer Creek in Nevada county, and is in the midst of a fine body of timber. It contains all the latest improvements, was put up regardless of cost, and will be in all respects a model saw-mill.

WORK will soon be commenced on the new leaching plant for the Ontario mine, Utah. The tanks and vats will be constructed in California and shipped to Park City ready to be put together. The plant will be of monster proportions. So near as can be judged from the manner in which the surveys have been made the building will be about 450x250 feet. It is also estimated the old mill will be turned into a leacher, and that the present battery will be capable of crushing ore for both plants, as by the leaching process the ore does not have to be crushed so fine and the new rock-breaker recently placed will be a great help. The old Nos. 1 and 2 tailings dams will be first leached, after which the plant will be started on Ontario ore.

THE river steamer Empire City arrived at Modesto on the 13th, towing a barge loaded with 200 tons of iron pipe for the new water-works. This is the first freight brought up the river as far as Modesto since 1869. Upon the completion of the railroad all river traffic was abandoned. The contractors, W. T. Garratt & Co., tried the experiment, as railroad freights were considered excessive. Since it was settled that steamers could navigate the Tuolumne river to this point, freight rates have been reduced. If proper encouragement is given, the boat, which belongs to the Stockton Navigation Company, will make regular trips every ten days. The captain is negotiating to take a load of wheat back.

At the annual meeting of the members of the Mechanics' Institute, held on Saturday night last, the long mooted question of whether or not to erect a new library building was finally settled. It was unanimously agreed that a new building with all modern appliances will be, during the next three years, erected on the pavilion lot at Hayes and Larkin streets. The construction of the new building on the pavilion lot does not necessarily mean the destruction of Mechanics' Pavilion. The ground on Hayes street between Larkin and Polk and extending seventy-five feet northward toward Grove street, known as the pavilion annex, will probably be selected as the site of the new building. All the prominent local architects will be asked to submit plans for the new library building as soon as the committee appointed by the Board of Trustees to decide exactly what is wanted has reported. At the annual meeting, the new officers elected on February 20th last were installed, when the Board of Trustees selected the following officers for the ensuing year: President, A. S. Hallidie; Vice-President, Marsden Manson; Treasurer, Charles A. Malm; Recording Secretary, R. P. Doolan; Corresponding Secretary, Grove P. Ayres.

Foundry Notes.

On Monday last sixty men went to work in the new shops of the Fulton Iron Works at Harbor View. The principal stockholders visited the works that day and saw the first casting made, consisting of a bed-plate and condenser for a marine engine intended for a steam lumber schooner. Within a few weeks all the buildings will be ready and about 150 men set to work.

The Union Iron Works have just completed a large model of their extensive works, which is to be sent to the World's Fair. The exhibit consists of a miniature panorama of the company's plant, and measures forty feet square, being one-quarter of an inch to one foot of the actual grounds occupied by the corporation. The work is composed of highly finished mahogany. The foundries, machine shops, sawmills, pattern-rooms, dry docks, offices, and, in fact, every department of the mammoth institution is represented by small buildings, and each is furnished with an electric light, which adds greatly to the effect of the workmanship. The railroad tracks and the company's water-ways also figure in making the picture a perfect one. Upon the dock may be seen a miniature representation of the line of battle ship Oregon, now nearing completion, and in the bay to the east are to be seen perfect models of the vessels built by the company. Among them are the steamship Pomona, the steamship Peru, the tug Fearless, and the U. S. steamers Charleston, Monterey, San Francisco and Olympia. The derricks, railway tracks, etc., are all represented in miniature. The large hydraulic dry-dock is also represented with a vessel upon it. The entire model was made at the Union Iron Works and cost be-

tween \$10,000 and \$15,000. The models of the vessels are particularly fine specimens and the whole model of the plant bears the marks of very skillful workmanship.

Personal.

RUFUS SHOEMAKER, well-known throughout the mining regions of this State, died at Grass Valley last week. He has been editor of the Grass Valley Union and Daily Tidings, and was editor and proprietor of the Grass Valley Telegraph at the time of his death.

EX-STATE MINERALOGIST WILLIAM IRELAN, JR., has been appointed by the California World's Fair Commission superintendent of the mineral exhibit of this State, and will go to Chicago in charge of the specimens.

REPRESENTATIVE CAMINETTI has been talking with the Secretary of War about the commission to be appointed to execute the provisions of the hydraulic mining bill. He wants the instructions to be broad in their scope and worded so as to give practical effect to the measure.

THE gentleman who wrote in the Forum, the article on "Cost of Producing Silver and the Profits of Mining," is James D. Hague, the well-known mining engineer, who was the author of the volume on the "Mining Industry" in Clarence King's Reports. He was at first geological assistant of King's corps, and has been prominently connected with geological and mining matters for many years. Notwithstanding, he is called in several mining papers, James D. Hoque, James D. Hayne or James D. Hague. Even in San Francisco, where he long resided, Mr. Hague's name was badly mixed in the daily papers.

Some Points in Silver-Milling by Amalgamation.

NUMBER IV.

Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.

The settler, as now generally constructed and operated, has the defect of allowing a gradual accumulation of the coarser and heavier part of the tailings, as well as permitting a stone, hammer-head, or any such matter, to cause considerable trouble if dropped in by any means, as will sometimes occur. As to the coarse sand, the practice is to remove it from time to time by hand, and, as it is mixed with amalgam and quicksilver, it must be ground in a pan in order to separate those and wash the sand away. I have found a way in which to wash coarse sand out of the settler while retaining the quicksilver and amalgam. The method has been published in these columns already and I need not repeat the description of it here.

I have heard many stories about "iron amalgam" and the trouble it gave in the melting of the bullion. Were I to confine myself strictly to my own experience, I could say but little about iron amalgam, as I have never made it in such proportion as to give trouble, nor have I been able to find out all of the causes of its production. I think a good millman need not make it. Iron is not susceptible to amalgamation unless by the aid of sodium or potassium, but apparent amalgamation may arise from the coating of ferruginous particles by lead or copper, to which quicksilver adheres and envelops the particle, which then enters the amalgam. Such ferruginous particles may be due to abrasion of the shoes and dies when the ore is ground in the pan, or to imperfect roasting of the ore by which a peculiar iron oxide is formed which has the property of precipitating copper, and probably lead, from reducible salts of those metals.

When the amalgam is thus contaminated the proper treatment is to work it thoroughly in the "clean-up pan," which is found in every well-equipped silver mill, first with water and lye, which is better if warm, and then under a flow of clean water. In this way the amalgam is rubbed off from the iron particles and they are washed away. All dirty amalgam and hard scale from the pans is similarly treated, fresh quicksilver being added if necessary. I once got a \$400 bar out of a pile of pan scale which I found on the ground outside of a mill, where it had been thrown by some "muscular amalgamator."

If amalgam containing much iron is retorted, it is hard or impossible to melt; the remedy then is to add sulphur, which combines with the iron, forming a fusible sulphide floating on the silver. As the requisite quantity of sulphur cannot be certainly applied, it is necessary to put some pieces of iron in the pot to reduce any silver sulphide which may be formed. Copper, if present, will also combine with sulphur, and then some loss of silver is inevitable and the matte must be saved for further treatment.

When coppery amalgam is retorted, the copper and silver separate to some extent. Contrary to my expectation, experiment showed that the separation is more nearly complete when the retort is heated quickly. I have often taken red copper and snow-white silver from the same retorted, spongy mass, but there were also intermediate grades. If the retort is opened while still very hot, as is often, though very improperly done, the copper may become oxidized and may then cause trouble in the melting. I have seen an inexperienced melter in great difficulty from this cause. He had a mess like a potpie in his pot—liquid silver with great lumps of infusible matter in it, which consisted of copper oxide mixed with silver and just so plastic that no amount of borax could liquefy the copper oxide. The man called that iron amalgam; perhaps others may have made a similar mistake. In the next melting I caused charcoal to be mingled with the metallic sponge in the pot; then covering and heating the oxide was reduced to metal and the copper-silver alloy melted readily, after which borax was added to slag the impurities. Copper may be removed from silver by means of sulphur, but the matte retains much silver, despite the presence of metallic iron, and the silver is liable to retain sulphur.

Very leady amalgam may be strained through flannel bags under hot water; that which remains in the bags is enriched, while that which passes through them is compar-

atively poor in silver and may be strained, when cool, through canvas as usual; the quicksilver which passes through still retains lead and a little silver.

When it becomes necessary to retort a large quantity of quicksilver to purify it I proceed as I stated in this paper some years ago, as follows: Into the upper side of the retort I tap a half or three-quarter-inch pipe, passing through the brick arches above, which is bent as an S tube and is surmounted by a funnel. The interior of the retort is painted with a paste of clay and ashes mixed with water, and the closure is luted with similar material in which the clay and ashes are so proportioned, by trial, as neither to crack nor peel off in drying; a little salt may be added with advantage. The retort is then dried and warmed by a small fire, after which several flasks of the quicksilver are poured in through the S pipe in the bend of which some remains, forming a valve which prevents the escape of vapor. The heat is then increased until the quicksilver begins to distill, when that temperature is maintained steadily. As the metal comes over it is replaced, flask by flask, by means of the pipe until all is finished, and, when cold, the retort is opened and a cake of lead is found. I am told that, in order that the distilled quicksilver may be quite clean, some powdered charcoal should be put into the retort before closing it; a little lime is also beneficial.

The life of a retort depends greatly on the care used in raising the heat slowly to the degree at which the mercury begins to distill, and then keeping as nearly as possible uniform temperature until the discharge slackens, when the heat must be again raised to dull redness and so maintained until no more quicksilver comes over, and the pipe is readily cooled by throwing water on it near to the body of the retort. With a properly mounted retort, as most are in these days, a good guide to the final temperature is that the end of a pine stick rubbed on the front end of the retort is charred and the streak of carbon left by it sparkles a little and burns off.

It is dangerous to open the retort while it is still hot, though that is often done; there is always some fume which is likely to injure the workman. With much lead in the amalgam, melting of the metal cannot be avoided, and the result is a solid slab, which, however, is easily cut to pieces on the blacksmith's anvil; but fine silver, or silver and copper, should never be melted in the retort; it should remain as a spongy mass, easily broken by means of a hammer for the crucible. The end of the pipe should never dip into water; a cloth wrapped around it should connect the pipe with the water in the vessel which receives the mercury, the pipe being kept cool by some kind of water-jacket. If the end of the pipe be submerged, a slight cooling of the retort causes the water to back into it, when an explosion occurs. This warning will not be needed by any experienced millman, but may be useful to some of our "new chums."

In regard to crushing appliances much might be said depending on different conditions; I prefer to say nothing rather than too little. As to furnaces and roasting also, I must plead the statute of limitation, indulging in only one remark. Where the inclined cylinder furnace is used I look on an auxiliary fire as a nuisance, and a needless waste of fuel. I much prefer Thompson's dust-returning apparatus, and, though I was never so fortunate as to have it, I satisfied myself of its utility by the aid of a couple of boys in Honduras. As, however, boys, in Honduras as elsewhere, object to being half roasted and suffocated, I adopted another plan, which suited me better than an auxiliary fire which I could not get properly attended to, and which largely increased my fuel consumption. When the flues were cleaned I piled the imperfectly roasted stuff on the ore-floor and, stopping the battery, passed the dust into the furnace by means of the screw-feeder. To my gratification, and slight surprise, it passed through very well, not much more than the usual proportion going again to the dust chambers. It is a curious fact that, in roasting with these furnaces, while 15 or 20 per cent of the ore may go to the dust chambers, that same "dust," if collected and passed in, will go through with about the same proportional loss. On the other hand, the ore which has passed through with a loss of 15 per cent or more in the dust chambers, will, if passed in again on account of imperfect roasting, lose nearly as much as it did before.

I will now conclude for the present, hoping these notes may be useful, and desiring, while frequent disappointment in similar cases almost forbids hope, that others may be stimulated to give us the benefit of their experience to some extent. As to my few remarks on the great question of the silver market, while I freely acknowledge the right of every person to have and to express his views, I decline in advance to enter into any controversy. I have given my idea; let others do the same if they so choose.

NOTE.—The operation of the Boss process may be thought to contradict my idea in one respect. In this process the ore pulp passes continuously through a series of pans and settlers. The first two pans are intended to grind the ore and no quicksilver is put into them. No doubt the silver is, more or less, metallized in the grinding pans and yet the process is very successful.

Two facts must be considered in this connection: Firstly, a portion of quicksilver finds its way from the amalgamating pans to the grinding pans, by regurgitation or counter-currents in the connecting channels; probably, however, this is not sufficient to amalgamate all of the reduced silver, though the fact that, in working the chloride ores of the Calico district, nearly all of the silver is collected in the first amalgamator of the set may throw a doubt on this. Secondly, bluestone as well as salt, is always used in the amalgamators, even in working ores; which would not seem to require it if treated in single pans, as usual; the chemicals are dropped in at brief intervals by automatic apparatus. The cupric chloride thus formed converts the metallic silver to chloride, which is again metallized by the iron pan, and amalgamated in the act.

I know an operator in Calico who claims to work closer than others, though getting more coppery bullion, because he uses more bluestone than others, preferring to make poorer tailings, even though the bullion may be of rather lower grade, because the greater part of the copper added in the form of bluestone must ultimately find its way into the amalgam so long as iron amalgamators are employed.

Thus, when all of the facts are taken into account, my theory is sustained rather than opposed by the action of the Boss process, if that can be called a theory which is the result of repeated experience and observation.

C. H. A.

The New Administration.

The accompanying portraits of President Cleveland and members of his Cabinet are direct from photographs and are, we believe, the best pictorial representation of Mr. Cleveland and of the men who are to be his advisors yet printed on the Pacific Coast. The list includes, besides the President,

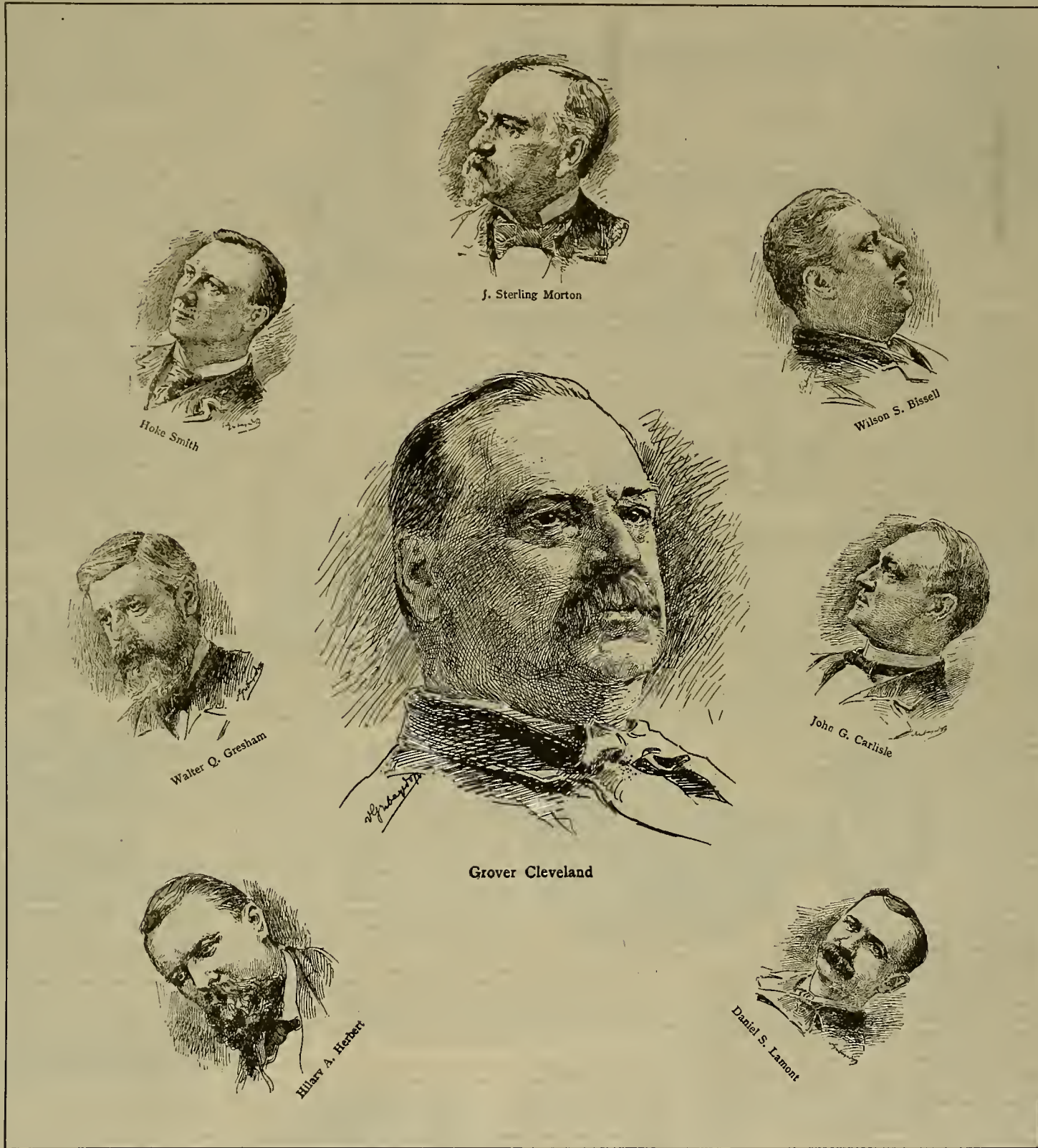
Hon. Walter Q. Gresham, of Indiana, Secretary of State.
Hon. John G. Carlisle, of Kentucky, Secretary of the Treasury.
Hon. J. Sterling Morton, of Nebraska, Secretary of Agriculture.

exercise is deemed necessary to maintain our National credit or to avert financial disaster." The meaning of this in plain terms is that Mr. Cleveland will not permit gold to go to a premium if, by the sale of bonds or any other financial expedient, he can keep the Treasury supplied with gold. And, taken in connection with his well-known position on financial questions, it means further that he will not permit a free silver coinage proposition to become a law if he can prevent it by the use of the veto power.

From the currency question, Mr. Cleveland passed to a review of what he called "governmental favoritism." It stifles, he said, the spirit of true Americanism and stupe-

paid to sugar-planters in the South, and to steamship companies running to South American ports, done away with.

Proceeding to the consideration of the civil service, Mr. Cleveland declared it to be a plain dictate of honesty and good government that public expenditures should be limited by public necessity and that this should be measured by rules of strict economy. One mode, he said, of misappropriation of public funds is avoided when appointments to office, instead of being rewards of partisan activity, are awarded to those whose efficiency promises a fair return of work for the compensation paid them. Civil



PRESIDENT CLEVELAND AND HIS CABINET.

Hon. Wilson S. Bissell, of New York, Postmaster-General.
Hon. Hoke Smith, of Georgia, Secretary of the Interior.
Hon. Hilary A. Herbert of Alabama, Secretary of the Navy.
Hon. Daniel S. Lamont, of New York, Secretary of War.

The single other member of the Cabinet, Hon. Richard Olney, of Massachusetts, Attorney-General, we are not able to present at this time, as no perfect photograph of him has yet been received at San Francisco.

Mr. Cleveland's inaugural address was briefer than his public utterances are wont to be. The first point touched upon was the currency. There is nothing, he said, more fatal to our supremacy as a nation than the want of a stable currency. We cannot, with all our strength and resources, defy the inexorable laws of finance and trade. He then referred indirectly to the dangerous condition of the National Treasury, adding: "So far as the executive branch of the Government can intervene, none of the powers with which it is vested will be withheld when their

fies every ennobling trait of American citizenship. The lesson of paternalism, he declared, ought to be unlearned and the better lesson taught, that "while the people should patriotically and cheerfully support their government, its functions do not include the support of the people." Continuing, he said: "The acceptance of this principle leads to the refusal of bounties and subsidies which burden the labor and thrift of a portion of our citizens to aid ill-advised or languishing enterprises in which they have no concern. It leads also to the challenge of the wild, reckless pension expenditure which overleaps all the bounds of grateful recognition of patriotic services, and prostitutes to vicious uses the people's prompt and generous impulse to aid those disabled in their country's defense." Reduced to plain terms, this means that Mr. Cleveland will urge a revision and purification of the pension laws, and that he will oppose any further extension of the pension system; that he will endeavor to have the bounties now

service reform had already accomplished much, he declared, and its promises of further usefulness entitle it to the ready support of all who desire to see our public service well performed, and who hope for the elevation of political sentiment and the purification of political method. With reference to the growth of trusts, Mr. Cleveland said:

The existence of immense aggregations of kindred enterprises and combinations of business interests, formed for the purpose of limiting production and fixing prices, is inconsistent with the fair field which ought to be open to every kind of independent activity. Legitimate strife in business should not be superseded by enforced concession to the demands of combinations that have power to destroy, nor should the people to be served lose the benefit of cheapness which usually results from wholesome competition. These aggregations and combinations frequently constitute conspiracies against the interests of the people, and in all their phases they are all unnatural and opposed to our American sense of fairness. To the extent that they can be reached and restrained by Federal power, the Gen-

eral Government should relieve our citizens from their interference and exactions.

The longest paragraph of Mr. Cleveland's brief address was with reference to the tariff, and we give it in full, as follows:

The people of the United States have decreed that on this day the control of this Government in its legislative and executive branches shall be given to a political party pledged in the most positive terms to the accomplishment of tariff reform. They have thus determined in favor of a more just and equitable system of Federal taxation. The agents they have chosen to carry out their purposes are bound by their promises, not less than by the command of their masters, to devote themselves unremittently to their service. While there should be no surrender of principle, our task must be undertaken wisely and without vindictiveness. Our mission is not punishment, but the rectification of wrongs. If, in lifting the burdens from the daily life of our people, we reduce the inordinate and unequal advantages long enjoyed, this is but the necessary incident of our return to right and justice. If we exact from unwilling minds acquiescence in this theory of an honest distribution by the hand of government of the beneficence treasured up for all, we but insist upon the principle which underlies our free institutions, and we tear aside the delusions and misconceptions which have blinded our countrymen to their condition under vicious tariff laws, we but show them how far they have been led away from the paths of contentment and prosperity. When we proclaim that this necessity for revenue to support the Government furnishes the only justification for taxing the people, we announce a truth so plain that its denial would seem to indicate the extent to which judgment may be influenced by familiarity with the perversions of the taxing power, and when we seek to reinstate the self-confident business enterprise of our citizens by discrediting abject dependence upon Government favor, we but strive to stimulate these elements of American character which support the hopes of American achievement.

In this utterance Mr. Cleveland distinctly reaffirms the pledge of the Democratic platform; and it becomes pertinent to give again the exact provisions of that platform. This is especially important because of the persistence of the partisan press in misconstruing and mistaking the facts. The radical journals and the radical party leaders are fond of repeating the utterly misleading statement that Mr. Cleveland's party is bound to immediately enforce free trade and that Mr. Cleveland is bound to urge such a policy upon Congress. The renewal of this pledge by Mr. Cleveland will afford a text for still further false and mischievous talk, and to the end that our readers may be prepared for it and in a position to estimate all such blarney at its full value, we give again the exact text of the Chicago platform with respect to the tariff:

The necessity of the Government is the only justification for taxation, and whenever a tax is unnecessary, it is unjustifiable; that when custom-house taxation is levied upon articles of any other kind than those produced in this country, the difference between the cost of labor here and labor abroad, when such a difference exists, fully measures any possible benefits to labor, and that the enormous additional impositions of the existing tariff fall with crushing force upon our farmers and workmen, and, for the mere advantage of the few whom it enriches, exact from labor a grossly unjust share of the expenses of the Government; and we demand such revision of the tariff laws as will remove their iniquitous inequalities, lighten their impositions and put them on a constitutional and equitable basis.

But in making a reduction of taxes, it is not proposed to injure any domestic industries, but rather to promote their healthy growth. From the foundation of the Government the taxes collected at the custom-house have been the chief source of Federal revenue. Such they must continue to be. Moreover, many industries have come to rely upon legislation for their successful continuance, so that any change in the law must be at every step regarded of the labor and capital thus involved. The process of reform must be subject in its execution to this plain dictate of justice.

There is in this no promise to wipe out the tariff laws. There is a promise to reform the tariff upon lines of reduction, but guarded by a pledge to be "subject in its execution to the plain dictate of justice." We make space for this quotation from the Democratic platform because it is essential to a fair comprehension of Mr. Cleveland's remarks on Saturday last.

In our judgment—with the Democratic platform and Mr. Cleveland's re-affirmation of its pledges in view—there is no reason to fear a sudden and damaging revision of the existing tariff laws. The necessities of the Government (including the pension charges) now amount to between four hundred and five hundred millions per year; and it is not likely that there will be any reduction until the pension list declines, as it will in time. There is no way to raise this enormous sum excepting by the tariff and revenue charges. The total income from these charges is not more than enough to meet the public necessities. In all likelihood some bounties and some pensions will be cut off, but they will not be sufficient to allow any very great decrease in either of our sources of financial supply. Under these circumstances, free trade or anything like it is out of the question. We take comfort in the opinion that those California interests which are bound up in the continuance of the tariff policy are not in danger from the Cleveland administration.

SENATOR STANFORD has made arrangements to erect a very large and complete wine-cellar and warehouse at Port Costa in which to store his wines and brandies made at Vina and to accommodate any others who wish to store their products there. The new buildings are to be located on the edge of deep water to facilitate the shipping of the wines and brandies. The warehouse will be regularly bonded. Senator Stanford and his wine manager, Captain McIntyre, decided on Port Costa as furnishing the best climatic conditions for storage of wines. The construction of buildings will probably be commenced very soon.

EX-CITY SURVEYOR MCGINNIS, J. W. McGinnis and J. R. Carty, of Yavapai county, Arizona, have bonded to William H. Guernheim, of St. Louis, a director in the Yuma Copper Company, the Bald Mountain, Sunrise, Gold Star, Amodeo, Potosi, El Dorado and Ontario mines, with the Gold Star millsite and spring, all about eight miles south of Castle Creek hot springs, for \$12,000.

Geology and Its Bearing on Economic Questions.

SAN FRANCISCO, March 14, 1893.

TO THE EDITOR:—Geology is sometimes thought of as a science which has nothing particular to do with the practical affairs of life—a science dealing with the remote past, the theories of which concern only those of a speculative turn of mind. The falseness of this idea I hope to illustrate in the following article:

Geology is the science of the earth, treating of its history as exemplified in the present physical features—the mountains, valleys, plains, the various rocky strata, their structure, composition and mineral contents. It has two aspects—the one purely scientific and the other economic or practical. On the scientific side, an attempt is made to explain the causes and succession of the various phenomena and the principles governing their action. Economic geology, on the other hand, treats of the rocks, minerals, soils, etc., from the point of view of values. It is one of the legitimate objects of a Mining Bureau. So intimately is the economic connected with the purely scientific, and in part dependent on it, that a certain amount of work in the latter line is absolutely necessary.

In this State, where our material prosperity is so largely dependent on the successful development of the mineral resources, an understanding and appreciation of the principles of economic geology become of the highest value.

While it is not the province of the State to assume the role of prospector, it is its business to investigate the various sections where minerals are known to exist, or are likely to be found, and from a study of the geological conditions obtaining to report upon their probable extent and value. The reliability of this report depends upon the accuracy with which the rock formations have been studied.

The character and extent of mineral deposits is dependent on geological structure. The presence or absence of coal and oil-bearing rocks is determined by a study of the age of the formation—a study based to a great extent on fossils. The likelihood of obtaining artesian water in a given locality is a problem which can be solved either by costly experiment or by an examination of the position and character of the strata.

The argument is advanced by some that the U. S. Geological Survey has been at work for many years in the State, and that it is useless to go over the same ground. The work of this survey is more of a technical nature, and its publications do not reach the mass of the people which the State publications would; besides, the vast collections of the survey are taken to Washington.

In the chief mineral districts, the geological work should include a careful mapping of the rock formation with location of the mines and mineral deposits, thus showing the relation of the latter to the formation, this map to be accompanied by a description of the extent and value of the minerals. This should be so reliable as to be of practical use to intending investors. The Bureau thus should be able to assert in what parts of the State investments in certain lines would pay and where not.

The excitement caused by reported rich discoveries, and the often consequent useless expenditure of time and money, would be proper subjects for investigation. A knowledge of the geology of such districts would aid very materially. There is a large area along the eastern border of the State supposed to be rich in minerals, but no reliable report has ever been made upon it.

The separation of the cretaceous and tertiary coal-bearing rocks from the older series in which coal and oil are not found is one of the most difficult problems to be solved, and one of very great importance. During the past two years the Bureau has discovered the key to this problem, and now further work through the Coast Ranges will define the boundaries of the two formations. By reason of the prime importance of coal and oil in this State, this question demands our attention. It would save many thousands of dollars in useless exploration if those areas were defined in which those products could not be found. To my personal knowledge, there has been considerable useless exploration carried on in San Luis Obispo county for coal and oil in rocks which have lately been proved to belong to a formation which in California does not contain these products.

The supply of water is another vitally important question. The sinking of artesian wells without a proper knowledge of the geological structure of the region often involves the loss of large sums of money. Of course, flowing wells will be struck experimentally, but how much more economical to have some definite knowledge on which to work.

Besides the saving of money, the reports of a geological survey as it is extended over the State would encourage the founding of many new enterprises, giving, as it would in the successive report, authoritative statements as to where certain minerals are to be found, their extent, accessibility, etc. This has always been found to be the case, although in reaching this degree of reliability many investigations have to be carried on which in themselves are not of any practical value.

In Minnesota, there has been a phenomenal growth of iron-mining, due in part to the investigations of the survey. In Ohio, Indiana and Pennsylvania, the surveys have laid the foundation for the greatly increased product of coal. In England, the Geological Survey predicted that the coal measures would be found to underlie a certain district where, to the ordinary observer, there were not the slightest indications. Several years later, during an experimental drilling, this prediction was verified.

There is a great deal that passes for geology that is not geology, and the subject as a science is thus often brought into disrepute among practical men. This is not the fault of the science, but of some of its followers.

As one of the lines of investigation of a State Mining Bureau, it seems to me it cannot be given too much prominence, for, properly carried on, it must result in attracting much capital, while on its scientific side it would be a great educational factor through the large collections of rocks, minerals and fossils. The State Museum, with the fine be-

ginning which it has made, would in time contain a complete representation of the mineral wealth of the State.

HAROLD W. FAIRBANKS.

The Cost of Silver.

TO THE EDITOR:—A few days ago you expressed some surprise at the attitude recently assumed by the "silver men," and it does, at first sight, seem paradoxical that people who pose as the friends of silver, that is, by implication at least, and of the silver-mining industry, should have taken pains to show that silver mining is not profitable.

I, for my part, have long been convinced that neither gold nor silver is practically worth to the world what it costs the world in the form of labor and of wealth produced by other industries, to say nothing of what may be called moral or sentimental considerations. But the same may be said of diamonds and whisky. The world could get along very well without either one of the quartette, and without many other things things that might be mentioned were it not for habit.

If we should charge the precious metals with all the toil and tears, the rock-breaking and the heart-breaking, the sweating and swindling, the facility which they, as coin, afford to all manner of vice and evil-doing, even as they facilitate commerce and well-doing, the blasted lives of many whom their glitter has allured from the path of useful industry to ways of suffering and hardship, to moral degradation and physical destruction, it might well be questioned if they are worth their cost.

But the gentlemen alluded to do not propose to go so deeply into the matter. They only propose to show that the ounce of silver for which the world is willing to give an amount of more or less useful service, represented by 83 cents in gold, really required for its production more than that amount of useful service; for money, of no value in itself, is simply a certificate of useful service, actually or supposititiously rendered, and entitling the holder to receive an equivalent amount of service in return.

It does seem like a queer way in which to promote the interests of silver mining. Do the "silver men" think that the world will pay more than it has to for silver, just because a certain number of people have been unsuccessful in their search for the metal? They are not such fools! What then is their object? What end do they propose to attain by their apparently paradoxical course?

There are three ways in which the price of silver, as measured in gold, might be enhanced: Firstly, by increasing the output of gold. This the silvermen are incompetent to do to any appreciable extent. Secondly, by increasing the utilization of silver. This they have tried to do and have failed so far. Thirdly, by reducing the production of silver.

There are two ways in which the output of silver might be reduced: Firstly, by the "silvermen" (and their special clients) ceasing to produce silver—in other words, "shutting down" their mines. Secondly, by inducing others to stop and deterring new investors. The supply of silver being reduced, those who shall have kept their mines open will reap the benefit of a better price for the product, at least for a time—perhaps long enough to put them "on velvet." After all, the silvermen may not be so illogical as they seem.

However, it is probable that silver production will always cost more than it will come to. If the price should be raised, prospecting and investment would increase, and an increase in the production would again lower the price. Even should the price not be again lowered, it is morally certain that so long as one man, or a few men, shall be making large gains by silver-mining, so long will many be wasting the wealth derived from other industries in futile efforts to enter the small circle of the successful. They know full well that if all should succeed, all must fail. They are spurred on, each for himself, in the hope that he may be the chosen one. This is, and always has been, the way of the world.

Mining for the precious metals is a legitimate business, yet it resembles gambling in one respect, namely, that it has many blanks to one prize. It lacks the essentially pernicious feature of gambling in that one man's gain is not another man's loss, as in vulgar betting on cards or the like. It is simply this: The world wants gold and silver; gold and silver may sometimes be found in such abundance as to enrich the finder, and men who have more or less wealth, which is in so far superfluous that it may be dispensed with for the moment, are not deterred by the risk of loss so much as allured by the hope of gain.

Those who actually do the work of producing are not the losers, neither are they the prize-winners. The losers are those who invest the wealth which they have acquired by other means. They take their chance of winning, and run the risk of losing of their own free will. If silver is lower than it was, while gold is certainly lower also (more abundant), it is clearly because silver-mining has been remarkably successful on the whole; the crop has been good.

One thing is certain, so long as one man, or a few men, can furnish all the silver the world wants for 83 cents per ounce, the world will pay no more for it, no matter who may choose to get it out of the ground at greater cost in the hope of getting it at less.

The price of a commodity is regulated immediately by the relations of supply and demand, not by the cost of production; that affects the price indirectly by ultimately affecting the supply. If we should all stop eating wheat and use corn instead, the price of wheat would go down and that of corn would go up, regardless of the cost of production. The holders of wheat would lose and the holders of corn would gain; then the farmers would stop growing wheat. The price of wheat goes down when the crop is unusually large; nobody asks what it cost to grow.

I can see no objection to the coinage of silver at the present face value, if the deficit be covered by a gold fund and if the silver be bought at its market price. Free coinage, as I understand it, would be worse than debasing the coin of the realm; it would be a fraud on the nation for the benefit of a class.

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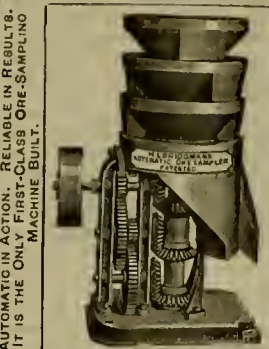
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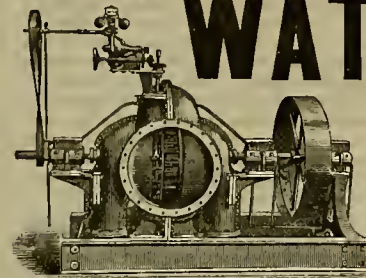


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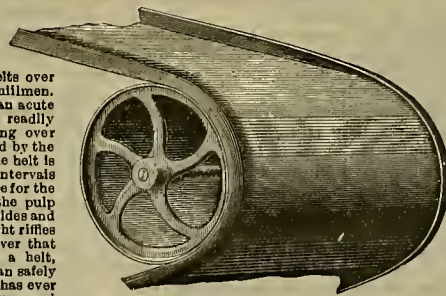
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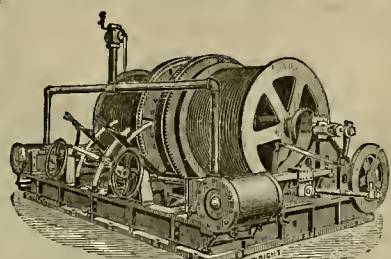
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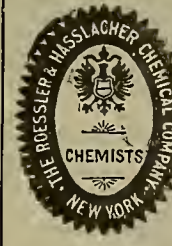
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Mechanical Progress.

Cylindrical vs. Conical Cam Rollers.

Oberlin Smith writes to the *American Machinist* as follows:

As the subject of conical *versus* cylindrical cam rollers seems to have recently attracted a good deal of attention in your columns, I take the liberty of quoting from some remarks upon the same subject, contained in one of my essays upon "Machinery Designing," published in October, 1885. "It will be observed that all 'side cams' (and conical ones, too) should, in order to obtain a more perfect rolling contact with the roller, be adapted to a conical (rather than a cylindrical) roller, with the apex of its cone at the cam's axis, precisely as if it and the cam were, at any point of contact, a pair of smooth frictional bevel gears. This construction would avoid sliding friction of the roller whenever the follower was at rest—that is, where the cam was 'running true'; but at other points the rolling action would be more or less imperfect, dependent upon the follower's speed, inasmuch as such speed is at any point a measure of the cam's divergence from 'true running' at that point. Although a roller slightly conical would give a better average effect in avoiding friction and wear than a straight one, yet the trouble of making a tapering groove, and the disadvantage of the end-thrust upon the roller and the members to which it is attached, that is incident to such conical form, will usually counterbalance the benefit referred to. In most cases, therefore, a cylindrical roller is preferable."

It is obvious, as above intimated, that the principle of a conical roller is correct only when the whole of the cam groove lies in a normal plane, in which case it is no cam at all. If we go to the other extreme and run the groove parallel to the axis, the roller should be entirely cylindrical and the cam would be trying to move it at an infinite speed, making it therefore infinitely impracticable. If the groove always ran in a mean direction between these two extremes, or at about 45 degrees, the roller should be somewhat conical, but not so much so as if it were a bevel gear.

In actual practice, where grooves vary in direction from a normal plane to about 45 degrees therefrom, it is evident that an approximation only can be made to a correctly shaped roller. In some cases I would advise doing this for the sake of getting a less amount of grinding action upon the sides of the groove and roller, although at the expense of some of the end-thrust, which would not occur if the roller were cylindrical. The objection to this end-thrust can, however, where the work is heavy, be overcome by the use of a collar containing roller bearings, a scheme which was not so practicable a few years ago, before the "bicycle age" had commenced, with its brilliant object lessons in the use of ball bearings.

It must be remembered that the conditions so far considered have been those of a roller mounted upon a follower sliding in a straight line, lying in the same plane as the cam's axis. When, however, it is carried by a swinging lever arm, as is often the case, its own axis does not at all times intersect that of the cam, and there is then and therefore an additional deviation from the bevel-gear principle.

In conclusion, I would say that, while the construction above outlined may be desirable in some special cases, a cylindrical roller, of as large a diameter as possible, but with a short face, is probably, on the whole, the best thing to use in the majority of cases, especially in light work.

The Ferris Wheel.

On the Midway Plaisance at the World's Fair there will be an exhibit which is intended to rival in novelty the Eiffel tower. This will be the Ferris wheel. Its diameter will be 250 feet. The wheel is intended to convey passengers around a circle in cars, from which visitors will have a full view of the exposition grounds and buildings. The wheel will be 264 feet in height. Around it, suspended between the two crowns by steel trunnion pins, will be 36 passenger cars with a seating capacity of 60 persons each. The entire structure is of steel and somewhat resembles a huge bicycle wheel revolving between two towers. The principle of construction is somewhat similar to an old-style English breast water-wheel, in that it consists of a stiff outer crown, which is suspended from the center axle by a system of tension rods. The wheel practically consists of two wheels placed on the same axle, spaced a distance of 28½ feet apart and held together by struts and ties. The great axle is the largest piece of steel ever

forged in this country, being 33 inches in diameter, 45½ feet long, and weighing 56 tons.

The axle is supported by means of steel towers 137 feet high. These are each supported by four legs, two vertical and two inclined, connected at the base by eight huge portal struts, thus forming an almost solid arch of steel. The foundations of masonry beneath the tower taper from an immense base to a height of 18 feet and under this are piles and concrete. Passengers, while indulging in their novel trip, will be just as safe as while riding out to the grounds on a railroad train. Arranged in groups on the rods around the crown of the wheel are 300 incandescent lights of various colors. These will be alternately extinguished and relighted at night as the wheel revolves. The engines which are to revolve this structure are in themselves an object of interest. They consist of two link-motion reversible engines of 30-inch bore, 4-foot stroke and 2000 horse-power.

The Ferris wheel is to be located in the middle driveway of the Midway Plaisance, about 100 feet from one of the entrance gates. The driveway divides at the wheel, and passing on both sides converges after the wheel has been passed. It is the personal invention of G. W. G. Ferris, a bridge engineer of Pittsburgh, and head of the firm of G. W. G. Ferris & Co. Robert W. Hunt of the Robert W. Hunt & Co. Inspection Bureau is president of the Ferris Wheel Co.

Wire Shafts for Steamers.

Samuel P. Jerome, of N. Y., writes to the *Scientific American* as follows:

In view of the frequent and especially the several quite recent instances of the breakage of steamship shafts, it may be of interest to the general public, particularly to sea-going travelers, to know the results of some experiments recently made with an elastic shaft constructed of steel wires of small diameter, massed and bound together so as to secure all required strength, and to possess elasticity, both torsional and transverse, to a degree not possible in a rigid shaft.

Rigid shafts are broken, mainly because it is not possible to maintain exact and true lines of shaft bearings in ships of great length, and frequently because of undiscoverable flaws and imperfections in the shaft metal. Ships bend when sailing in rough and boisterous seas, and variations of atmospheric and water temperature expand and contract the metal of the hull, causing powerful bending strains which crystallize the metal of the shaft, weaken and ultimately destroy its vitality, until rupture and possibly serious disaster is realized.

In the construction of a wire shaft, every part, from the center to the circumference, comes under the observation of the expert in charge.

The experiments referred to show that when the shaft is in position, and when rotating stress is applied, a tensile force is exerted upon the individual wires and their several fastenings. Each is a unit of strength and sustains its pro rata of the total amount of stress. The law of action and reaction determines the amount. It cannot be greater than the available power of the engines of the ship in any given case.

The strength of the individual wires and of the fastening being known, it is practicable to ascertain the potential strength of the shaft as a whole. Suppose it to be made in five sections, its total length one hundred feet, and its diameter fifteen inches. The shaft will have twenty-five thousand No. 7 steel wires, each twenty feet long, with their fifty thousand fastenings. Each wire and each fastening will sustain a load of five hundred pounds without rupture or injury, making a total inherent strength of 37,500,000 pounds, twenty-five times greater in amount than the continuous force of an engine of 5000-horse power. A stress of 25 pounds only upon each unit of strength, each point of resistance existing in a wire shaft as named, will more than equal the force of such an engine.

The wires of each section are welded together at their ends, making a solid mass of steel upon which couplings are fixed for bolting the several sections together. The spaces between the couplings are inclosed in short metal bands holding the body of the wires of each section in their normal cylindrical form, at the same time permitting a transverse elastic or bending movement when the ship bends, also elasticity of torsion when powerful waves strike the propeller wheel, lessening, or altogether eliminating all risk of injury to the crank and engines.

An additional inherent element of strength becomes active when torsional stress is applied to the shaft, viz., the friction of the individual wires pressing one upon another.

The greater the stress, the greater will be the amount of friction.

If built with reasonable care and skill, such a shaft cannot be broken in any emergency or under the severest conditions.

The cost of building a wire shaft will also be very much less than that of a rigid shaft.

Scientific Progress.

Explosions and Explosives.

At the University College, Nottingham, Prof. Clowes delivered a lecture, under the auspices of the Midland Association of Colliery Managers, on the above subject. The lecturer stated that explosion being due to sudden expansion, it is necessary, when produced by heat, since the expansion must be considerable, to employ either gas or vapor. All ordinary explosives depend upon the production of a large volume of gas by a change similar to combustion; the heat expands this gas or vapor largely and augments the products. Any combustible gas or vapor can produce an explosion if it is suitably mixed with air, and the mixture is fired. Accidental explosions occur from this cause, but the explosive course is also utilized in the gas and petroleum engines. A solid combustible dust, mixed intimately with air, may also fire and cause explosion. All explosives employed for blasting purposes must, however, be self-contained and burn independently of the air. They must be able to undergo the explosive change with great rapidity, generating much gas or vapor and much heat. They must not generate noxious or poisonous gases or vapor by explosion, and must be compact and easy of transport. When used in the coal mine, they must not be able to fire air containing dust or fire coal-damp. Blasting powder answers most of these requirements, but it is unsuitable for the coal mine because it ignites fire-damp. The more powerful dynamite and blasting gelatine are safer than gunpowder in this respect. After describing the nature and properties of these modern nitro compounds, reference was made to the modern methods of firing them by detonation, which far exceeds the rate of firing produced by deflagration in gunpowder by means of a fuse. The explosion produced was proportionately increased in power, and the danger arising from the projection of sparks from the fuse was abolished. Fire-damp, when present in air, is exploded by a temperature of 650 degrees C. All ordinary explosions produce a temperature much higher than this, probably none of them below 2000 degrees; but it is found by experiment that the rapidly exploding modern explosives, although they produce a higher temperature than powder, are far less likely to fire gas or coal dust in the air. This is explained by the fact that gas requires time to kindle. In some experiments as much as ten seconds were found to be requisite, when the gas and air were heated above 650 degrees in order to kindle them. The powder, burning slowly, gives the requisite time; and, further, it projects glowing and burning particles into the air, which aid the kindling. Additional safety has been secured with the high explosives by mixing them previously with ammonium nitrate. This substance reduces the temperature of the explosion; and yet, by detonating itself together with the explosives, prevents the force from being too much reduced. Tamping with moist sand has been found to complete the safety of these modern explosives, when the weight of the cartridge used does not exceed eight ounces.—Invention, of London.

Brain Substance.

At a recent meeting of the Académie de Médecine, at Paris, Dr. Constantin Paul related his observations (Sem. Med.) on 11 cases which he had treated by means of injections of brain substance into the subcutaneous cellular tissue. Three of the patients suffered from chlorotic neurasthenia, three from classic neurasthenia, one from permanently slow pulse, and four from locomotor ataxia. The liquid used was a ten per cent solution of the gray substance of the brain of the sheep, sterilized by carbonic acid in Arsonval's apparatus; the injections were made into the lumbar or gluteal region, the dose being five cubic centimeters (80 minims) at most.

The treatment is reported to have been well borne, as a rule producing no reaction, either local or general. In these 200 odd injections made in the 11 patients, abscess or acneic pustules resulted in no instance; occasionally, however, slight lymphatic engorgement was observed, which disappeared in three or four or, at the most, seven days.

The first effect noticed by the patient was a sensation of increased strength and comfort, the previous muscular weakness diminishing rapidly. The vertebral pains and spinal hyperæsthesia disappeared after a few injections; the lightning pains of the tabetic subjects, the neurasthenic headaches, the insomnia, and the cerebral impotence all vanished in their turn. The appetite returned, and those patients who were previously dyspeptic now assimilated their food so well that they began to increase in weight. In the tabetics sexual power returned with the general improvement. The author, therefore, considers the injection of gray brain substance a nerve tonic of no mean value.

Dr. Paul compares a neurasthenic patient with an accumulator which it is impossible to charge. While the morbid condition lasts, he is unable to transform his food into force; after the least effort his muscular and intellectual forces are exhausted. But, it is maintained, the injection of cerebral matter in the manner described promotes the utilization of food and its due assimilation so that the nervous system now becomes a chargeable condenser by means of which the subject acquires force which he can dispose of at will. It should be noted that it is the nervous force which first returns in all these cases; subsequent to, and consequent to, and consequent upon this, the power to do intellectual and muscular labor comes back, the improvement in the condition of the blood following later on.

In conclusion, the doctor claims that the subcutaneous injection of brain substance alleviates and cures neurasthenia much more rapidly than the ordinary therapeutic measures—iron, arsenic, phosphates, opium, alcohol, etc.; and its action is more prompt and certain than that of hygiene alone, or that of suggestion, ovariectomy, or even electricity. *Merck's Bulletin.*

Spontaneous Combustion of Coal.

With respect to the ventilation of a cargo of coal, with the idea of removing inflammable gases, Professor Clowes, of Nottingham, has pointed out that this might itself be a source of danger. Four colliers were loaded with coal from the same seam, and by means of the same tips. Three were ventilated and proceeded to their journey to Aden. None of these reached the port, being all lost by the spontaneous firing of their cargoes. The fourth was not ventilated, and it reached Bombay in safety. There was little doubt that the air inclosed in the cargo was insufficient to give rise to dangerous heating, and that the introduction of additional air by ventilation enabled the heating to occur by supplying the requisite air. Coal which had heated in the air and begun to cool again was safe from risk of further heating; hence, storing coal in the air for a sufficient length of time before loading was a precaution which would be calculated to insure the safety of the cargo.

The following practical conclusions were submitted as deducible from the facts presented: 1. The danger of spontaneous firing of coal in large lumps is very slight; it is much greater with small coal, and greater still with dust. The increase of danger is due to the larger extent of surface exposed to the air in proportion to the mass of the coal. 2. Air-dried coal which contains more than three per cent of moisture is dangerous; if it contains less the danger diminishes, as the amount of moisture is less. The moisture present in the coal is a measure of its absorptive power for air, and the most absorptive coal is the most dangerous. 3. The danger is somewhat increased by the presence of pyrites, in large quantity, not because this heats the coal to any appreciable extent, but because, when moistened, it swells—breaking up the coal, and exposing a larger surface to the air. 4. Newly won coal should be shielded from the air as much as possible, to prevent the chance of rapid heating, and for the same reason it is best not to stack it in large heaps, since these retain the heat. Ventilation of the coal often adds greatly to the risk of spontaneous firing. 5. All external sources of heat, such as steam pipes, boilers and hot flues in the neighborhood of the coal, add very greatly to the risk of firing. Spontaneous heating becomes vastly more rapid when it is thus assisted by outside sources of heat.

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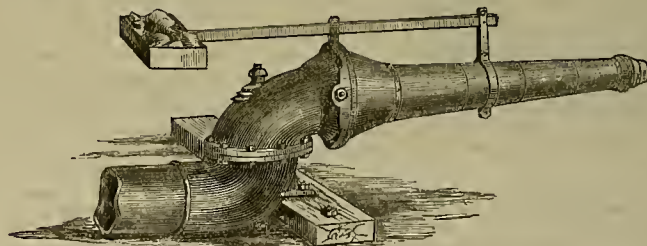
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Electricity.

Is the Steam Locomotive an Electric Generator?

A curious trouble was recently reported to us by a Pennsylvania telegraph man, says the *Electrical Review*. It seems that at a particular time each day the telegraph instruments at a certain railroad station indulged in curious freaks, emitting long sparks, shocking the operator and behaving in every respect as though there were a heavy lightning storm somewhere upon the line. The persistent regularity with which this trouble occurred, even on the clearest days, with no traces of atmospheric currents to be found, together with a careful but fruitless investigation for all known possible causes, served to deepen the mystery. It seemed to be one of those "spook" troubles which form the basis of many of those stories which make part of the stock in trade of every old-time telegrapher.

Things went on in this fashion until one day the operator noticed that the sparks from the instrument seemed to keep time with the blasts of steam from a locomotive which was standing immediately below the troubled wire. Following up this clue, it was found that the spark could be produced at will by blowing off steam from the locomotive under the wires. It so happened that it was necessary for the locomotive to stop each day at this point to take water; so the position of the wire was changed and the trouble never reappeared.

It seems such an extraordinary kind of a telegraph fault, that our Pennsylvania friend has much difficulty in having his story accepted among the fraternity.

Another case that comes to our notice, where a line was troubled in a similar way, and the lineman sent out to investigate the difficulty got a series of shocks, which corresponded in time to the puffs of a locomotive a short distance away from him, directly under his wires. The steam locomotive not being usually regarded as an electrical apparatus, it seemed extraordinary that it could produce an electrical disturbance on neighboring wires.

We are inclined to believe, however, that both of these stories are correct and that the locomotive is the direct cause of the trouble, in fact it forms a beautiful example of the hydro-electric machine of Lord Armstrong. This is a machine which consists of an iron boiler, containing a fire and mounted on insulated legs. Steam under pressure is generated and allowed to escape through a number of nozzles, in such a manner that the particles of water carried with it are charged with frictional electricity, and collected upon a suitable surface held in proximity to the jets.

By this means very long sparks have been produced and it is capable of giving a very severe shock, in fact its discovery was due to the accidental shock which a workman received who happened to hold one hand in a jet of steam escaping from a boiler and the other hand upon a safety valve, thus forming a circuit of his body, through which the current flowed.

It is not altogether clear that the phenomenon we have been describing might not in some cases be a dangerous one to a certain electrical apparatus. Take the case of a trolley wire under which a locomotive is blowing off steam. Under these circumstances a dangerous spark might be produced in the armature of the central station generator which might result in a short circuit. There are, we believe, no records of such accidents, but wherever a trolley wire is likely to come under such influence we think it is well worthy of investigation.

New Method of Preparing Filaments for Glow Lamps.

The Buda-Pesth Incandescent Lamp Company has introduced some marked modifications in the manufacture of incandescent lamps. The uncarbonized filaments of wood, cotton or other vegetable fiber are first immersed in a bath containing 25 to 30 per cent of potassium silicate, 10 to 15 per cent of gum arabic, and 12 or 13 per cent of caustic soda. After removal they are rolled to the section of an angle iron, which is said to give a strong filament with a considerable superficies. The filaments are then carbonized, after which they are mounted and placed in a bath of melted paraffine or naphthaline. After the latter has become solid by cooling, a current is passed through the filaments, melting and vaporizing the paraffine in their immediate neighborhood, and causing a deposit of carbon, as in ordinary flashing. It will be seen, however, that by this method the carbons can be standardized before being placed in their

bulbs. Liquid paraffine is said not to work, as convection currents are then established in the bath, which bring all the oxygen entangled in the bath in contact with the filaments sparking them. The solution in which the filaments are soaked before carbonizing is said to protect them during carbonization, and to give them a uniform surface, on which carbon can be deposited during the flashing process. The gum arabic is also beneficial, the filaments being stronger after carbonization when it is used. When the resistance of the filaments has been brought to the proper point by the flashing process, they are removed from the bath, and any excess of paraffine or naphthaline sticking to them is washed off with alcohol.

THE bill allowing the Eckington & Soldiers' Home Railway Company, of Washington, D. C., to use horse-power upon its lines awaits the signature of the President. The road asked for the relief on account of the failure of the storage system on the G-street line. The officers say that it is expensive and incompetent, and the weight of the cars is ruining its roadbed. It is probable, however, that the horse-power will only be used on the Capitol Hill extension, as the company will use the trolley where allowed.—*Electrical World*.

ACCORDING to the London *Engineer*, Mr. Danchell, a Danish engineer, claims to be the original inventor of gutta-percha covered wire, which he invented in 1840 to 1845. The first wire used, he says, was in 1847, between Berlin and Frankfurt. Alexander Siemens, in the same journal, claims that Dr. Werner von Siemens was the original inventor, and substantiates his claim by referring to a legal decision in New York, in which the matter was investigated.

Useful Information.

An Adjustable Railroad Whistle.

John Cronin has invented a modification of the calliope whistle that beats the original invention clear out of sight, says the *Truckee Republican*. The original is a clumsy cast affair, with three compartments, and admits of three tones. Because it is cast in one solid piece these three tones cannot be changed, nor can the whistle be removed from the boiler when there is any steam up. If a road wants to adopt a calliope whistle, it must discard all the ordinary whistles and put calliopes in their places. This involves a great expense, but many Eastern roads have made the change. Cronin conceived the idea of changing an ordinary steam whistle into a calliope, and has succeeded so well that he can change any locomotive whistle in 15 minutes to a finer calliope than the original inventor ever listened to. On the inside of a whistle he places a core having four or more metallic flanges which divide the interior into as many compartments as there are flanges. A vertical section of the whistle would now resemble a wheel, the side of the whistle forming the rim or tire, and the flanges looking exactly like the spokes. Cutting pieces of rubber from an old car spring, he fits them carefully into these flanges, but at different depths. For instance, if there are four compartments and the whistle is six inches long, one of the spaces is filled with rubber to within an inch and a half of the mouth. The second compartment is filled to within three inches of the mouth, the third to within four and a half inches, and the fourth is left open or vacant and is six inches deep, or as deep as the bell itself. Screw the whistle into place and turn on the steam. Filling the short compartment first, the one that is only an inch and a half deep, a heavy base sound is emitted. A little more steam sends out an alto from the three-inch space. Open the valve wider, and the four and a half inch gives forth a tenor; and, finally, when the full head of steam gets to work, the six-inch space adds a shrill treble to the quartette, and you have a full-fledged calliope. This is exactly the whistle now in use on the Swing train which runs from Truckee to Reno, for Cronin made it and runs the engine. He also has two of his whistles on the Virginia & Truckee railroad. The whistle of the Swing train was an old mill whistle formerly in use at Virginia, but any whistle can be changed into a calliope by Cronin's method. The train boys had a whistle on the caboose and one on the tender of the Swing train, operated by air from the exhaust of the air-brakes. An ordinary railroad whistle can be changed to a calliope at an expense of less than one dollar. Different tones can be produced by pushing the rubber cushions farther in or out. As many different notes can be obtained as may be

desired, and, by opening the steam valve slowly, each separate note will be sounded, one after another, and finally all of them will sound in unison. Cronin will obtain a patent on his invention, for it does not conflict in any manner with the existing calliope patents. He ought to make a fortune from it. Whenever our readers hear the whistle of the Swing train, let them remember that there is something in it.

To Utilize the Refuse of Towns.

The deposit of sewage and house dust is one of the most important and usually one of the worst managed of the difficulties with which every town has to deal. If the town is fortunate enough to be on the banks of a river, it is almost a certainty that the river will be converted into an open sewer. If there be no river, the refuse will be dumped on some vacant plat, generally in the neighborhood of dwelling houses, and always near enough to affect the health of the inhabitants. The annual estimated amount of "sludge" to a town with a population of 50,000 is, exclusive of surface water, slop water and manufacturers' refuse, over 25,000 tons. The enormous refuse of large towns can now be handled and utilized by the use of the destructor with the greatest ease, to the great benefit of the health of the population and the coffers of the municipality. The refuse is emptied into a number of cells, and by a wave-like motion is gradually moved forward over the furnace. All the moisture and impurities are thus removed and the dry product can be used for a variety of purposes. The temperature of combustion is over 2000 degrees Fahrenheit, and this intense heat, when applied to raising steam or generating electricity, renders sufficient power available to more than repay the cost of both collection and burning. This question is being much discussed in England, where electrical and borough engineers are earnestly canvassing the merits of the latest modifications of the destructor. A company has been formed for contracting to supply electric light derived from the dust refuse of towns. The company claim that 20,000 tons of house dust, if treated as they suggest and burnt in suitable boilers, might be made to produce as much as 56,000,000 indicated horse-power hours, equal to an engine of 1183 indicated horse-power working for 4734 hours, for electric lighting.

PUMICE STONE.—We often hear it remarked, and particularly after the eruption of a volcano, that pumice stone ought to be plentiful and cheap, as quantities must have been ejected during the volcanic disturbance. As a matter of fact, however, none of the white stone in general use is obtained from active volcanoes. It comes from deposits of the article discovered in one or two quarters of the globe, the best of which is at present to be found in the island of Lipari, situate in the Tyrrhenian sea. The island is mountainous in character and consists of tuffa and lavas and highly silicious volcanic products. The district where the stone is found is called Campo Bianco or Monte Petalo (1500 feet above the level of the sea). After riding a considerable distance, partly along precipitous paths sufficiently dangerous to be interesting, and partly through vineyards and over grassy plains, one almost suddenly comes upon a seemingly snow-clad narrow valley, inclosed by hills, also quite white, and the whole glaringly bright on a sunny day. Into these hills workmen are ceaselessly digging deep burrows, working within by candle-light. In their excavations they come across many lumps of pumice stone, which are placed in baskets, subsequently being conveyed along the valley to the seashore, where small boats are loaded and sailed to the seaport near by, where the stone is sorted, packed and shipped to distant parts, either via Messina or Leghorn.—*The Builder & Woodworker*.

WAS THERE AN AGE OF COPPER?—Mons. Berthelot, the well-known technician, in a recent communication to the Academie des Sciences, states his belief in the sometime existence of an age of copper in addition to the three recognized archaeological eras of stone, bronze (copper and tin) and iron. He bases his opinion chiefly upon an analysis of a piece of copper which had been found by Mons. de Sarze in the course of antiquarian investigations in Mesopotamia, or Al Jezira, as the Arabs designate the famous stretch of country between the Euphrates and the Tigris. The fragment thus chemically determined proves to have neither tin nor zinc entering into its composition, there being simply traces of lead and arsenic. Water and the atmosphere had made ravages into the specimen, which was practically a sub-oxide, or a compound of protoxide and metallic copper. As the

ruins from which the piece of metal was taken are authoritatively considered to be more ancient than even those of Babylon, Mons. Berthelot does not hesitate to promulgate the theory that an age of copper preceded the bronze and iron periods, especially as the examination of the component parts of a portion of a metallic scepter which, it is alleged, belonged to a Pharaoh who reigned in Egypt some 3500 years B. C., showed no sign of the presence of tin.

PEAT AS FUEL.—The recent attempts to use peat in smelting iron and under locomotive boilers have been naturally looked upon with great interest in Ireland, which country has practically no coal, while one-seventh of its whole surface, or 3,000,000 acres, consists of peat bog. Dr. Emerson Reynolds, who has given much time to the study of the subject, states that peat compares very unfavorably with coal in many ways. It is five times as bulky as coal, it contains from 15 to 25 per cent of water, and seldom less than 10 per cent of ash, and, bulk for bulk, its thermal value is only one-thirteenth of that of coal. The fresh peat, moreover, contains 35 or 40 per cent of moisture, making necessary considerable expense for drying. During a coal famine some 20 years ago, Dr. Reynolds proposed converting the undried peat into gas, and this was successfully done in the shops of an Irish railway, the efficiency of a ton of peat used in this way for working up scrap iron being 60 per cent of that of a ton of coal used as gas by the same method. Since then the extraction of ammonia from gasified peat makes this process more practicable. A promising new suggestion is that peat shall be used in making water gas, which can be conveniently supplied for domestic and industrial purposes.

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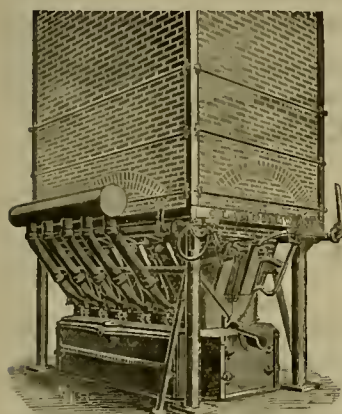
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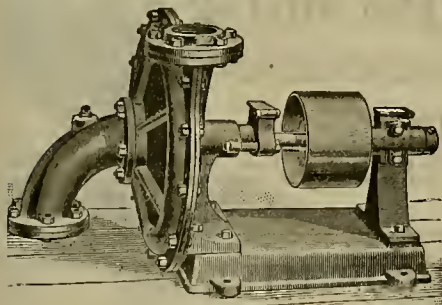
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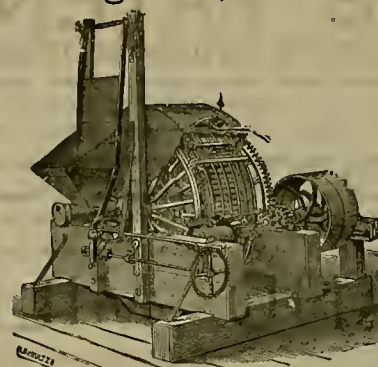
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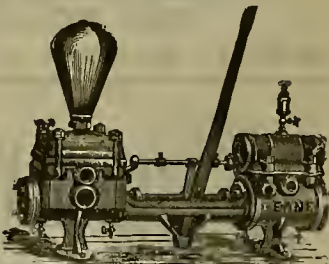
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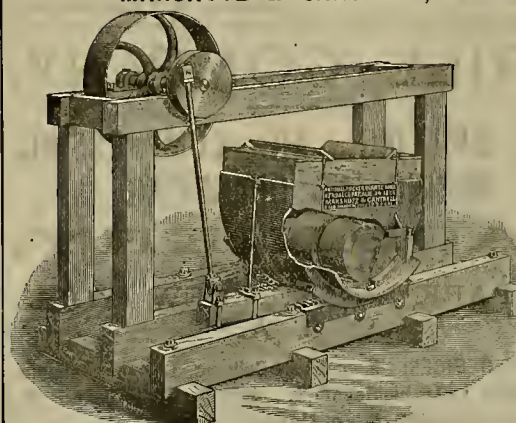
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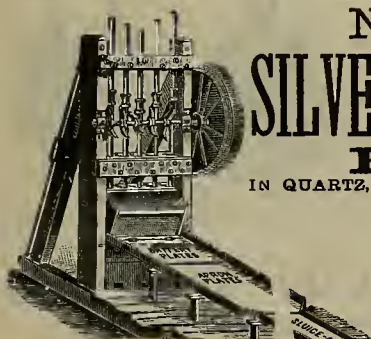
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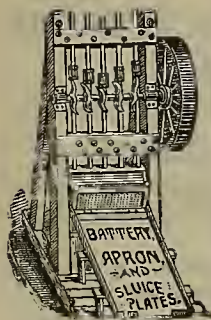
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

TUNNEL.—Cor. Calaveras Citizen, March 11: It is reported that Geo. Hengen, of the Hengen mine, has gone to San Francisco upon business connected with his mine at Indian Creek. It is stated that a contract will soon be let to run a tunnel or extend the present one. From all reports the mine is looking well. The lode, though in hard strata, is of splendid quality and well defined in richness. No doubt there is a good mine there.

DISCOVERY.—Daniel Thompson reports that his brother has recently discovered a vein of ore existing upon his ranch a short distance north of Murphy. The old gentlemen claim that the rock contains not only gold but silver also in quantities that is flattering. It is reported furthermore that several years ago some one found a good paying lode upon the land above named, but knowing it to be claimed and patented he desisted from any further investigation.

AROUND MURPHY.—Cor. Calaveras Citizen, March 11: On the "Enchantress," N. E. of the Oro Minto shaft, there is a shaft down 100 feet on the two-foot vein of excellent quality. At this depth levels have been run 55 feet N. E. and 138 S. W. of the shaft. The average pay per ton of ore worked in the company's mill—burned down some years ago—was \$20 per ton, free milling; 2000 tons were worked. The tailings were stopped in a large reservoir built for the purpose, and a recent run of several tons brought \$7 per ton, and, besides gold, containing silver, lead and antimony. It is estimated that there is thus confined over 2000 tons of these tellings, and with the various dumps in proximity from which quartz could be selected, would keep a five-stamp mill running several years with profit. In close proximity of the Calaveras property is the Washington and Right Power on the north end the Fenien, owned by the Oro Plata Co., and the Fricot property on the west, and other mines convenient for a milling proposition. On the dumps of all these mines are tons of quartz of good quality. A company had been formed to work the tellings of the Calaveras Co.'s mines and the dumps and arrangements were made with the owners to do so, but were disappointed by a change in the arrangements of the disposition of the Washington mill, and lately by the contemplated opening of the Oro Minto by Mr. Horswell & Co. It is believed by those conversant with this district and have a practical knowledge of mining that capital alone is all that is needed to make this favored mineral region team with life and prove highly remunerative to the owners of mining property in the district. The reopening of the Calaveras group of mines on Indian creek will mark an era in mining enterprises in the Washington district that will be successful and lasting. The property has recently come into the possession of Mr. J. S. Horswell & Co., who will continue developments on the 400-foot level of the "Oro Minto" as soon as roads will permit the hauling of lumber and machinery on the premises. Mr. Horswell is an experienced miner and is engaged in mining enterprises elsewhere. He, in company with Frank Marshall, who has an intimate acquaintance with the property for years, looked over the property recently to determine the nature of necessary work preparatory to resuming operation. It is well known among miners who have worked in the lowest depths of the mine that work was directed there contrary to the judgment of some of them, and that, in their belief, the large body of ore—three to seven feet wide—lying westerly of main shaft will prove to be remunerative. There is another shaft on the "Oro Minto," 325 feet deep.

STARTED UP.—Calaveras Chronicle, March 11: The Good Hope Mining Co., whose claim is situated on the Mokelumne river, about a mile and a half from this place, has again resumed active operations. A contract has been let to run a tunnel into the old "Pink Smith" mine, which is now owned by the Good Hope Co., and in which there is good ore known to exist. Mr. J. H. Jacobs, of this place, is superintendent of the company.

Inyo.

JUST SO.—Inyo Index, March 11: A New York mining expert, who recently visited Owens valley and inspected mines in the adjacent Inyo range, was well pleased with the mines, but says the transportation facilities here are much against the mining interest. He further said that it would be very difficult to get people into this section until we had shorter rail communication; that when a man got to Belleville, he was ready to turn around and go back.

A BIO DEEN.—A transfer has just been put on record from A. L. Tubbs, assignee of the Harmony Borex Co., Meridian Borex Co. and California Chemical Co., to F. M. Smith for a large body of patented borex lands in South-eastern Inyo, the consideration being \$150,000. The deed covers 111 pages of county records.

Nevada.

STEEL HOLLOW.—Nevada Herald, March 10: About a year ago an item appeared in the Herald describing the Steel Hollow mines. A full description was then given of Jno. Hussey's quartz claim, the Grand Victory, and it was predicted that this mine would in the future be valuable. Time has proven that such is the case. This discovery will perhaps lead to important mining developments in the once-famous Remington Hill mining district. In days gone by, many rare nuggets were found in

the vicinity of Steel Hollow. In 1864, James Green found a nugget at Remington Hill valued at \$7000, and at various times nuggets were found valued at \$2500. In 1876, a Chilean named Pete Castro worked in Tiger Ravine, now owned by John Hussey, and situated within his mining claim. Before going to his native country, Chili, he showed a friend a double handful of quartz nuggets. This fact would tend to prove that Mr. Hussey has the ledge from which they came, and that there are many more nuggets in his claim. This mining section, like many others, was affected by the closing down of the hydraulic mines; but since, quartz and drift developments have proven it to be a rich mining district. Directly opposite to the Grand Victory are the Harrison and the Pioneer Steel Hollow placer mining claims, belonging to W. O. Gray and John F. Coe. Two large tunnels have been run into these claims, and enough work has been done to demonstrate that they are good mines. The owners undoubtedly have a rich channel, for some valuable nuggets have been found by them. The gravel is blue and easily worked, no crushing being necessary. The extension of the Harrison claim is owned by Venice, Greeley and Beightol, and it is also a good mine, as has been proven by quite extensive developments. Another proof of the value of the claims above mentioned is the fact that, in early days, Steel Hollow paid thousands of dollars up to these mines, but it never paid much beyond them.

GRASS VALLEY "PROSPECTS."—Telegraph, March 10: The regular monthly meeting of the directors of the St. John mine will be held next Saturday evening. The mine is looking very favorable. Sinking from the 300 level will be commenced shortly. The Baltic will soon place an errestre on its ground for reducing the ore. The directors are of the opinion that the ore can be worked to much better advantage by this process than by milling. Some very rich rock is being taken from this mine. The Wyoming will hold its annual meeting for the election of officers Saturday evening. Active work will shortly be commenced on this mining property. Mr. Joseph Everett has been awarded the contract of moving the old hoisting works of the Green Mountain to the new shaft. The South Idaho Company has its new patent steel whim in operation. It does excellent work, and is attracting much attention from mining men of this locality.

RICH QUARTZ IN THE MAYFLOWER.—Gress Valley Union, March 15: A remarkably rich shoot of quartz has recently been struck in the Mayflower mine at Canada Hill, and the rock that is being taken out excels anything found in this section for a long time. The ledge is about a foot wide and the ore will yield several hundred dollars per ton. How extensive the shoot remains to be seen. It was struck while making an upraise, and at present is pitching toward the surface. It may not last long, or it is possible that the ledge breaks before reaching the surface and takes a downward pitch, in which case it will probably prove very extensive. The rock taken from the mine will average, just as it comes, \$60 per ton. Although the mine has been worked for a number of years by tunnels and shafts, no great depth has ever been attained. The incline through which the company is now working is very flat, and the point where the rich shoot was encountered is probably not over 40 feet below the surface.

SUPERINTENDENT RASIONAL.—Grass Valley Telegraph, March 10: On Saturday evening Thos. H. Moore, who has been the superintendent of the St. Johns mine, resigned his position and Lewis Wheeler was appointed in his place. Mr. Wheeler has had a large experience in mining and will push the work forward. A dump is being sunk in the lower level, and as soon as that is completed the work of sinking the shaft still further will be commenced.

Mono.

MILL STARTED.—Bodie Miner, March 10: The Bodie mill started up Wednesday on ore from the Bulwer mine, with prospects of a long run. There is a large quantity of ore on hand and a lot more to be taken out.

BODIE CON.—During the past week east crosscut, 550-foot level, was extended eight feet. Upraise, 200-foot level, was extended 20 feet. South drift from west crosscut, 200 foot level, Lent shaft, was extended 26 feet. There were employed 5 miners, 1 carmen, and jointly with Mono 1 engineer, 1 blacksmith, 1 watchman, 1 foreman.

MONO.—During the past week east crosscut from main south drift, 550-foot level, was extended 15 feet. West crosscut from same drift was extended 10 feet.

Placer.

IOWA HILL.—Pleaser Herald, March 11: We learn from Mr. Bonham of Iowa Hill, who was in Anbaru this week, that times at the Hill are pretty good, and that the passage of the Cennett mining bill encourages the people of that part of the county to hope they will be better before they are worse. The Morning Star and the Big Dipper (formerly Hormen) drift mines are both running steadily and both paying well, and between them are giving employment to about 70 men. Spies have been pretty thick around the Hill lately, but of course they found nothing to report on that is contrary to what ought to be. They are generally well heeled, and, not being very good poker players, the boys in the mines are getting so that they like to see them come around. In fact, the opinion is spreading that the more flush spies the valley people can send into the mountains, the better for mountain people.

Siskiyou.

BLUE GRAVEL CO.—Yreka Journal, March 8: The Greenho N Blue Gravel Mining Company has been reorganized, and the claim will be under the management of Tim Anstin, an ex-

perienced miner from Scott River, who has means to go ahead with the work in a systematic manner. The shafts and tunnels will be timbered up in the most scientific style, and a number of superior miners have been engaged, with the expectation of hoisting pay gravel within another week's time. This claim, formerly known as the Lee, Lash & Co. mine, is one of the best in the county, but requires working on an extensive scale and in a most thorough manner to elevate the rich blue gravel lying on the bedrock 100 feet down, as there is a great amount of water to contend with, requiring steady use of the steam-pumping machinery for drainage. J. S. Spencer, Kingsbury, Mullen & Co. are still opening up the new quartz ledge in the Siskiyou foothills, near Cole's, just this side of the Oregon line, and have undoubtedly a very rich ledge. Several other locations in the same vicinity are also turning out well, and will be worked on an extensive scale as soon as the snow melts away to get around easier on the surface. Mr. Howell of the San Francisco Company, working a quartz mine near forks of Humboldt, is in the county inspecting the work in progress under the supervision of Mr. Hunt. The miners are sinking down another prospecting shaft, and, as soon as sufficient good-paying quartz is taken out, the mill will be started up for crushing.

Tuolumne.

WORK PUSHED.—Tuolumne Independent, Mar. 11: The Cook, Gloster & Ryan quartz mine is situated one-half mile below the New Albany. The shaft is 40 feet deep, and the vein averages four feet wide. Free gold is seen in the rock, and it assays \$2000 per ton. It is evidently the richest milling vein in the county, and work is being rapidly pushed to prove that there is no mistake about it.

QUARTZ.—Tom Heles and Ches. Richards have discontinued work on their quartz mine in the Mrs. McQuade field. The boys were well deserving of a bonanza for the perseverance and energy manifested in the labor of sinking an incline 60 feet, in hard ground, and running levels therefrom. There may be thousands in value of the precious stuff but a few feet from where they did their last work. Yet this is a measure of unknown quantity. Thus, like many more mining enterprises commenced in the county, they go under by reason of a lack of capital to continue work.

REDUCTION WORKS.—Mr. L. Mason is running his reduction works in full blast. Oscar Bleir is looking after the roasting department, while Mr. Mason attends to the chemicals and process of chlorinating and separating the gold. Teams pass daily loaded with ore that is being conveyed to the works for reduction. Thus, the outlook for the Sonora Reduction Works the coming season is encouraging.

MINING IN TOWN.—G. L. Mead, who is mining the Masonic lot, corner Broadway and Washington streets, Columbia, has struck a rich sink, adjoining the brick building—or rather, two sinks separated by a small stream. One, probably the largest, pitches under the building; the other, toward the stable lot, in the direction of the Water Co.'s office. Mr. M. washed up on Friday last week, after 28 days' work, using water 18 days, and took out 55 ounces, about \$1000. He also gathered about a handful of coins of almost every description—copper, silver and gold—the mintage of various countries. Among the collection were a \$5 coin of 1838; half-dollar of 1807, now worth \$3.75; a dime of 1843, now worth 60 cents. The labor is performed by Mr. Mead and a hired man, and the result shows an average pay of \$18 per day to the man. The prospects are for better yet. We would like to congratulate him, but he don't need it—coin talks.

NEVADA.

Washoe District.

CON. CAL & VA. MINA.—Virginia Chronicle, Mar. 11: 1500 level.—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 14th floors above the sill floor of this level. 1550 level.—Have continued making necessary repairs to the drift on the sill floor of this level. We continue to extract some ore from the old stope, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stope in working north from the crosscut run west from the northwest drift. The north drift started 150 feet in from the northwest drift has been advanced 11 feet; total length, 45 feet; in a porphyry end quartz formation of a very low assay value. At a point 52 feet down in the winze started in the west crosscut a south drift has been advanced 28 feet in a porphyry and quartz formation of very low assay value. Have extracted during the week from the 1500 level stope and 1650 northwest drift openings and raised to the surface 545 cars of ore, about 540 tons. Shipped to Morgan mill 223 1310-2000 tons of ore. Average assay value, per railroad car samples, \$29.13. The Morgan mill will commence to work this ore on Monday next. Bullion shipped to Cerson Mint, assay value \$23,351.96.

OPHIR.—500 level.—Jointly with Mexican Co. are doing some necessary repair work in the west drift from the shaft through which the water flows that drains the upper portion of the mine. The water from this level is conveyed through pressure pipes to the 1465 level and with the use of water-wheels we get power to drive our ventilating blowers and fans. 1465 level.—We have the hoisting machinery in place at the head of the upraise and cages in operation through the upraise to the 1565 level. Will commence sinking the winze from the bottom of the upraise on Monday of the coming week.

MEXICAN.—On the 1465 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze has been ex-

tended 14 feet; total length, 31 feet, continuing in porphyry formation showing clay slips. Jointly with the Ophir Co. on the 500 level from the Ophir shaft are doing some necessary repair work, to keep a regular flow of water running to the shaft, from which we get power to drive water-wheels that run our ventilating fans on the 1465 level.

UTAH.—340 level.—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 22 feet; total length, 165 feet; continuing in porphyry, clay and quartz formation.

SIERRA NEVADA.—Have completed repairs to intermediate tunnel and resumed work in The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 24 feet, making the total distance west of the joint shaft 3000 feet; the face is in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 24 feet, making the total distance west of the shaft 3000 feet; the face is in porphyry.

ANDRES.—On 420 level north drift from east crosscut No. 1 north advanced 15 feet; total length, 146 feet.

GOLDEN & CUAAY.—200 level.—During the past week, crosscut No. 5 started in northwest drift, 432 feet from main west drift, has been advanced 19 feet, passing through porphyry and seams of clay; total length, 366 feet. Sinto tunnel level.—The joint east crosscut with Best & Belcher Company has been extended 19 feet; total length 61 feet; face in porphyry.

BEST & BELCHER.—200 level.—West crosscut No. 1, started in northwest drift, 170 feet from our south line, has been extended 18 feet, passing through quartz and porphyry giving low assays; total length 114 feet. 900 level.—West crosscut No. 3, from top of upraise No. 1, from 1000 level, has been extended 8 feet; total length 166 feet; face in hard porphyry. Work in this drift has been discontinued. The joint east crosscut with Gold & Curry Company has been advanced 19 feet, passing through porphyry; total length, 61 feet.

HALE & NOACAOS.—We have put in new guides in the south compartment of the main shaft down to the 1100 level and are now repairing the shaft below this level, to allow the cage to run to the 1300 level while new guides are being put in place in the north hoisting compartment. Main Incline.—We continue making the necessary repairs. 1400 level.—Are retimbering the main north drift on this level. 1800 level.—West crosscut No. 1 from the main south drift was advanced 18 feet; total length, 183 feet; face in quartz and porphyry. West crosscut No. 4 from main north drift was advanced 18 feet; total length 230 feet; face in porphyry. The north prospecting drift from end of west crosscut No. 3 was advanced 20 feet; total length, 25 feet; face in quartz and porphyry.

CHOLLAA.—The north drift from the south line, 550 level, is out 243 feet; face is in quartz that assays from \$6 to \$12 per ton. Are repairing the upraise above the 450 level and retimbering the two north compartments of the main shaft above 930 level. The east crosscut 260 feet south of the north line, 930 level, is out 40 feet; face is in porphyry.

POTOSI.—Are repairing east crosscut 350 feet south of north line, 850 level. The east crosscut opposite Potosi winze, 930 level, is out 296 feet; face is in hard porphyry. The west crosscut from south drift, 260 feet east of Potosi winze, 930 level, is out 28 feet; face is in soft porphyry. The north drift, 260 feet east of Potosi winze, 930 level, is out 24 feet; the last ten feet show a 12-inch streak of quartz with bunches of good ore throughout it. The north drift from top of raise, 1000 level, is out 170 feet; face is mostly quartz that assays from \$7 to \$12. The south drift from top of raise, 1000 level, is out 243 feet; face is in soft porphyry. No work has been done on the 1800 level the past week on account of retimbering the West shaft. Extracted and sent to mill the past week 424 tons and 750 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 430 tons; on hand at mill, 134 tons and 500 pounds. Average battery assays, \$24.54. Average car sample assays, \$26.39. Shipped to U. S. Mint, Carson, 525 pounds of crude bullion.

NEW YORK.—Have been grading and timbering incline winze below the 650 level. The west crosscut, from the southwest drift, 850 level, is out 90 feet; face is in low-grade quartz and porphyry.

SILVER HILL.—The southeast drift, 450 level, has been advanced 5 feet, through hard porphyry; total distance from north line, 67 feet.

ALPHA.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

EXCHAUQUE.—No work has been done on the 1800 level of the Ward shaft during the week, on account of timbering the Ward shaft.

WARD SHAFT.—Had to stop prospecting work on the 1800 level the first part of the week to retimber the shaft, 1000 feet below the surface.

KANTUCK.—160 level.—We continue to extract from two to three tons of ore per day of the average value of \$30 per ton as per car samples. The south drift from the Jacket east crosscut on 1100 level is in 170 feet. The face is in fair-grade ore.

OCCIDENTAL.—The main north drift on 750 level has been extended 15 feet; total distance from winze station 674 feet; the face is in fair-grade ore. No. 2 winze from south drift, 750 level, is down 12 feet; bottom in low-grade ore. The Zadir drift, Sinto tunnel level, has been extended 14 feet; total length, 863 feet; the face is in hard porphyry.

Tuscarora District.

NAVAJO.—Times-Review, March 10: The stope above the 350-foot level are looking

about the same. Have started a slope at the south end of the old works on the 150-foot level.

BELLE ISLA.—Line drift, 250-foot level, extended 15 feet; rock getting softer. The stopes above this level are yielding about the same.

NORTH BELLA ISLA.—The stopes above the south 300-foot level are looking about the same. Have discontinued the north 300 stopes.

Ferguson District.

RICH FIND.—Pioche Record, March 9: A rich find is reported from a claim of Cassidy & Conaway, lying north of the Hunter claim, a mile north of Helena, in Ferguson district. A sample brought to town indicates an iron gangue, while metallic silver can be plainly seen throughout the piece, which is stated to assay \$7000 a ton. The extent of the ore deposit or ledge is not given.

Yellow Pine District.

KAYSTONA.—Pioche Record, March 9: A. Werner returned last Saturday from a two months' trip to Yellow Pine district, where he went to look after mining interests of his. The most promising claim of which he reports, outside of the Keystone, is the Clementina, on which he did some surface prospecting and also sunk a 12-foot shaft. The shaft is sunk on a hold outcrop of honey-combed iron, showing a ledge averaging three feet in width with an ore seam of from 15 to 20 inches. Several assays were made from this seam, ranging from \$125 to \$540 in gold per ton. The ore in color resembles that of the Keystone claim. We erroneously stated heretofore that the Clementina adjoined the Keystone; such is not the case, however. It is some 800 feet farther up the hill and on a separate ledge, which from the formation thereabouts strengthens the general belief that the claim will prove most valuable. Several chunks of ore from the claim are to be seen about town. The district in general is quiet just now, four men only being employed at the Keystone. The quarter interest in the claim held by C. O. Perry has just been purchased by I. C. Blake, of Denver, for \$20,000, and active work on the mine may be resumed at any time. Mr. Blake is the moving spirit in the Nevada Southern railway, building from Goffs to Yellow Pine, and is a desirable man to have interested. The half interest owned by Jos. Taylor, the locator of the claim, is also bonded, and if new parties take hold of this interest the mine will be worked vigorously from the start.

Central District.

A MILL.—Silver State, March 6: The Blackbird mine in Central district, which was purchased last week by F. W. Dunn and S. S. Robinson, will, in a short time, become a producing property. The owners have bought a mill at Galena, Lander county, which will be torn down and removed to Central. E. M. Fellows of this place will superintend the work, and a force of men will be sent to Galena to-day to dismantle the mill. A number of buildings will also be removed from Dun Glen to Central. The owners of the Blackbird have one of the richest mines in the State and mean business. In a very short time, shipments of the yellow metal from Central will be in order.

Pioche District.

AT BULLIONVILLE.—Pioche Record, Mar. 9: The operations of the Bullionville Mining and Reduction Co., promising as they do to continue for many years on the material known to be on hand and ready for treatment, in which respect they differ from the ordinary mining operation, are of general interest. The work of the past few months has demonstrated the practicability of profitably working the immense beds of tallings there, and the work is to be facilitated by the addition of more leaching tanks. Six new tanks of 60 tons capacity each have just been ordered from San Francisco. These will replace eight of the present ten-ton tanks, so that the leaching capacity will be raised to 300 tons for the six large tanks as above, and 60 tons for the six small tanks which will be retained, making a total of 360 tons capacity, as against 140 as now. By giving six days in which to run through a charge of ore, there will be five charges per month, equaling 1800 tons, or 60 tons per day. With such ample facilities for time in leaching, a weak hyposulphite solution will be used, by means of which the silver will be extracted, and the bases for the most part left unaffected. The sulphides, moreover, will assay up in the thousands, and altogether yield a much higher profit than has been possible under the former treatment. To meet this increased demand, in addition to the large Howell furnace, which can chloridize 50 tons of sands per day, a new reverberatory furnace has just been completed, which will chloridize from 10 to 15 tons of elimes per day. From what has already been done, no doubt is entertained that the chlorination from the Howell furnace will reach at least 75 per cent, while those from the reverberatory will be considerably higher. The only thing now needed to enable this large quantity of roasted pulp to be handled with ease and economy is additional cooling floor, and for this adequate provision is being made by utilizing the old slag dump adjoining the reduction works on the east. The new leaching tanks will be 15 feet in diameter by ten in height, and will be loaded automatically by means of a chain elevator, which will take the roasted pulp direct from the cooling floor. The reduction in cost of treatment which will result from these improvements will be about one-third, while the gain in extraction in silver and gold will doubtless be as much more. Already the mill is running steadily and turning out sulphides in good quantity, despite the disadvantages under which the company is laboring, the net results of which have abundantly demonstrated the stability of the enterprise and bode well for the early future large and continuous profits,

even at the present low price of silver, something, by the way, which we regret to say does not apply to the generality of our mines hereabouts. Altogether, the outlook for Bullionville is more than promising, since something like adequate compensation for the time, labor and money spent on this enterprise is now absolutely assured, and it is pleasing to note that the indomitable will, energy, pluck and dogged perseverance of W. S. Godbe, who has already done so much for this section, and who appears never discouraged, no matter what difficulties may present, are to be thanked for the success of the enterprise.

ARIZONA.

DOS CABEZOS.—Tombstone Epitaph, March 8: The Silver Cave Mine in Dos Cabezas, on the extreme west end of the mineral belt, is now a competitor the honor of being one of the big mines of the district. The Silver Cave is one of the oldest mines in the district and belongs to S. R. Delong. A large amount of work has been done upon it and an immense ledge of moderate-grade ore has been developed. In 1885 a shaft was sunk on the side down the hill, or south side of the big ledge. Instead of sinking it straight the man who had the contract put it down on an incline, for the reason that it was easier working. About ten days ago Mr. Delong thought he would put the shaft down about 50 feet deeper, and placed two men at work to straighten the shaft. In this work a streak of ore was encountered, which widened as work progressed, and at the bottom of the shaft there is a ledge 20 inches wide which assays \$208 gold per ton. How wide this is Mr. Delong does not know, but a crosscut will be run at once to determine it. The shaft had originally been put down within a few feet of this vein and had been running away from it as depth was attained. Mr. Delong had some of the rock with him to-day. A proposition is on foot to start the Philadelphia 15-stamp mill, which has been idle for several years. This mill is located in the town of Dos Cabezas, and is fitted with pans and concentrators.

LUCKY CUSS.—The shaft or winze below water level in the Lucky Cuss is down 200 feet. It will be sunk 20 feet further before prospecting is commenced. A station will be put in at the 200, the 20 feet of shaft below it being used as a sump in case of a flow of water being encountered in prospecting.

NORAS.—Mojave Miner, March 10: The El Dorado canyon mill is running steadily on ore from the Mocking Bird and other mines owned by the Southwest Company at that place. The strike on the 300-foot level of the G. A. R. mine at White Hills still continues to produce ore of extreme richness. The company feels jubilant. Ed. Gilbert and partner are at work on the Cupel mine, Stockton Hill, and are getting good ore. They will make another carload shipment next month. The Chloride smelter is waiting for coke, which, owing to the heavy rains of the past week, has been laying here awaiting transportation to the smelting works. A carload of gold ore was received at the Kingman camp from Wm. Grant, Hackberry, the first of the week. The ore is high-grade gold rock from a Music mountain mine and goes away up. Dan Shean and three other gentlemen of White Hills have leased a portion of the Prince Albert ground and have a contract to sink the shaft, formerly worked by Blaine and Phenix, 50 feet deeper. The Diamond Joe has been a good producer of high-grade ore since its discovery, and the gentlemen have one of the bonanzas of this section. With proper management this mine will undoubtedly make a record for itself. Jas. Uncapher, Chas. Gross, Jr., and Jose Canyas left Sunday for an extended prospecting trip through the southern portion of the county. Their field will be in the vicinity of old Greenwood on the Big Sandy. Ed. Phenix and Geo. Blaine have completed their contract on the Prince Albert ground at White Hills and have commenced operations on a claim owned by them between the G. A. R. and the Prince Albert. They have a good showing to begin on and will undoubtedly make a good stake out of their property, as they are both energetic workers and practical mining men of long experience. C. W. Barry and R. M. Kennedy, of Denver, Colo., have obtained control of the Diamond Joe mine in Cedar district. The terms of the contract are about as follows: The parties have the property leased for nine months and pay the owners, P. E. Collings, Russell & Ziener, Jesse Orozco and the Martinez Bros., 25 per cent royalty on new workings and 30 per cent on the old workings. If at the end of six months these gentlemen deem it advisable, they will pay \$25,000 for the property outright. If not, they will work it three months longer and then agree to pay the owners \$27,000.

MONTANA.

THE FLINT CREEK MINING DISTRICT.—Phillipsburg Mail, March 11: Regardless of the paltry price now being paid for silver, we find throughout the hill many prospects under way of development, and good shipping ore is being extracted from some of them. There is no question but that the mining industry will continue to multiply in this section while silver can be sold at anything like what it is worth, and should the white metal receive a knock-out blow in Congress, under the new administration, the mines of this district would be the last in the State to stop operations. The location of Phillipsburg, the county seat of Granite county, makes it a natural center for a vast section of rich country from every point of the compass, and there is a production of more than metals to warrant its permanency. The beautiful Flint Creek valley has already enriched scores of ranchers, and each year the production from its lands becomes greater and new tracts are being constantly improved for agricultural purposes. The lumbering industry is carried on to quite an extent, and there is opportunity for greater operations of this kind, as

the vast forests of beautiful pine and fir may well be termed inexhaustible. No estimate can be placed upon the riches that may yet come from the unprospected fields, or at least those that have only been run over by the tourist prospector. Each year exceeds its predecessor in rich finds, and while many fortune-seekers can only imagine wealth in some far-off land, those who remained at home and prospected where mineral was known to exist have usually reaped a harvest of the much-sought treasure.

THE GRANITE MOUNTAIN.—The Granite Mountain Co. has lately been credited with a rich strike in the Granite-Rimsey tunnel, but the local management of the company has given out that there was no truth whatever in the report. The report of the tunnel strike must have gained circulation, however, from the report sent to the company's home office, giving particulars of the discovery of 18 inches of 1158-ounce ore in the seventeenth level east, where, it is said, the greatest deposits yet unvelled in the Granite mine are being exposed.

OREGON.

PIPING TIMES OF PROFIT.—Rogue River Courier, March 16: H. M. Chapin came in from the Poorman place, on Grave creek, Monday. He has been piping contently of late and has good prospects of a profitable cleanup. He says there are no less than nine sets of pipes and monitors on lower Grave Creek (below the railroad) all singing merrily as they wash Josephine hillsides into the ravine and start the "slickens" on its way to the mouth of Rogue river.

WILLIAMS CREEK.—The neighborhood of Williams Creek is becoming famous for the frequency and value of its quartz ledges. Several mills have been erected recently and these will start grinding ore when the roads dry off sufficiently to allow hauling from the tunnels to the mills.

SILVER DISCOVERY.—H. B. Slater, one of our pioneer mining men, informs us that a 12-foot vein of native silver has been found in tunnel eight. The find is the property of Sol Abraham, who will visit the point shortly with engineers to determine the course of the vein with a view to tapping the ore at the surface of the hill. Mr. Abraham owns three 40-acre tracts adjacent and the lode has been traced through each tract, but it goes no farther. Piles of silver ore can be found along the railroad, where it had been dumped by the tunnel-diggers, who had no idea what valuable stuff they were handling. It is considered lucky that Sol Abraham has become possessed of the ledge, as it will take considerable wealth to develop it.

SOUTH DAKOTA.

COPPER ORES.—Deadwood Pioneer, March 8: As spring approaches, there is a good deal of talk about certain rich copper locations on Box Elder, and it is quite likely that some extensive development work will be done on some of them during the coming summer. It has long been known that rich copper ore could be found in this region, but very little work has been expended in trying to find an ore-body of large enough proportions to work at a profit. As the outcroppings are unusually large, it is not likely that it would take any extraordinary sum to develop a mine.

CARACONATA FLUME ANNUAL.—At the annual meeting of the Carbonate Flume Company, held yesterday, the following officers and directors were elected for the ensuing year: Wm. Lander, Pres.; T. H. Russell, Vice-Pres.; W. S. Elder, Sec'y and Treas.; R. N. Ogden, V. T. McGillicuddy. The company owns a fine water-right, mill-sites, placer ground, etc., on Spearfish creek.

CUSTER PAKE.—A great deal of work is at present being done in the Custer Peak mining district. A shaft is down on the St. John property over 100 feet, and a crosscut of 50 feet has been made, which discloses the fact that the vein is a large one. The gold ore, which is free-milling, goes from \$7 to \$35 per ton. A two-stamp mill was erected on the property last fall, but was unable to run on account of the severe weather. It was started up a couple of weeks ago, and a cleanup will be made this week. The owners state that if the cleanup is satisfactory, they will erect a 20-stamp mill during the coming summer.

IMOGENA PROPERTY.—Development work on the Imogene property, near Perry, is progressing satisfactorily, and three vertical veins of free-milling gold ore are now being exposed in excellent shape. The ore goes \$5 per ton, pan test, and the property is likely to become an important bullion-producer at no very distant date.

UTAH.

THE SAN JUAN PLACERS.—S. F. Examiner, March 8: Gen. W. J. Palmer, president of the Rio Grande Western Railroad and a prominent figure in Western railway circles, has come over from Salt Lake City on a brief visit to this city and Los Angeles. The General recently sent F. Greene, an exploring engineer and a member of his official staff, to make an investigation into the recent gold-mining excitement in the San Juan country in Southern Utah. Mr. Greene has lately made a report to him, and in talking about it yesterday he said: "Mr. Greene has reported to me that the excitement of last December and January over the San Juan gold placers was a false alarm. He found on personal investigation that gold did not exist in paying quantities, the story having been made out of whole cloth. According to his report, it appears that there is a small amount of fine gold in the San Juan river, on the banks on either side of it and in the strata of clay which run through the sandstone formation. This gold has been known to exist for years, having been prospected for by miners as long as 30 years ago; but it is of such a character and of such fineness that no ordinary

process will save it. In panning or using a rocker, it is so light that considerable of it escapes before the black sand is washed off. Men working with either process could not possibly make sufficient for the purchase of ordinary supplies, aside from wages. While on his tour of investigation, Mr. Greene and his party examined the gravel bars on the Colorado river for a distance of 40 miles in a boat down the river. He started from North Wash, four miles above Dandy Crossing. Thirty-two bars were investigated, and he personally panned out gravel on a number of them. In no case was there a barren pan, the least number of colors to a pan running from 40 to 50, and as high as 150 colors. He says the gold is quite fine, but that there should be no difficulty in leaving it. He estimates that the different bars run from an average of 25 cents to 75 cents a cubic yard. He instances the case of two men who are now working on the California bar on a portion of it where the gold is finer than the average. He says these men are making wages, though using a crude rocker and having to handle the gravel three times. They have taken out in the regular course of their work \$10.50 from seven cubic yards of gravel. Mr. Greene in detail then reports that the placers continue down the river for a distance of a hundred miles, the gravel being very regular in size, and there being no boulders of a weight but what one man could easily remove them. He approximately cubed the contents of the 32 bars he investigated, and found that they contained about 100,000,000 cubic yards, which, at an average value of 35 cents per cubic yard, would result in a money value of \$35,000,000. He thinks the source of the gold on the Colorado river is from the Henry mountains, and he also noted that the gold appeared to be equally or evenly distributed throughout the gravel, as there seemed to be but little difference in value whether tests were taken from close to the surface, midway down or close to the bedrock. He was informed that working tests gave the same results. Mr. Greene did not visit the Henry mountains, but he says it is reported that there are 2000 acres of unusually rich placer gravel on their east slope—gravel which will run from \$1 to \$12 per cubic yard. The difficulty there has been a lack of water, and the gravel has been worked by the dry process. He thinks this spot will become an active scene of operations in the spring, for quite a number of men have already gone there. Other men, he says, who intended going into the San Juan country are now waiting at Green river for the cold weather to pass by in order to get into the Henry mountains."

THE RAP ROSA MINE.—Salt Lake Mining Journal, March 10: From time to time the Journal has made mention of the work being done in the Red Rose mine at Silver City, Tintic. It has been known for some time that a big strike had been made in this property, but Will Groesbeck, the manager, has been very reticent on the subject. Through one of its various channels of information, however, the Journal has been enabled to glean some authentic news, as follows: Early yesterday morning air connections were made with the main shaft through the old tunnel. In the drift, 400 feet from the shaft, a four-foot body of ore was cut that runs over 100 ounces in silver and \$10 to the ton in gold. Twenty-five feet farther another body of similar ore was encountered. This body was crosscut for about 15 feet, when a horse blocked the way. Cutting through this, ore was again found through which the drift was run for 20 feet without striking the hanging wall. This is an immense body of high-grade ore, the extent of which cannot be ascertained without doing a large amount of development work. One shift is now employed in taking out ore from the first strike. By Sunday or Monday air pipes will be put in and air connection made, when night and day shifts will be put on and regular ore shipment will begin. The Red Rose is destined to become a great producer.

THE PARK CITY SAMPLER BURNED.—A fire originated in the boiler-room of the Park City sampler yesterday afternoon. In the absence of water the entire building and its contents were destroyed. Five cars loaded with ore, standing on an adjacent sidetrack, were also consumed. The loss is estimated at about \$25,000, with insurance of from \$14,000 to \$15,000. Mr. Mackintosh went up to the Park this morning, and will make arrangements to put up a larger and better plant immediately.

SITUATION AT THE BACK.—A telegram from Eureka states that the Bullion-Beck mine started up yesterday with a force variously estimated at from 30 to 50 men. It is learned since that but 16 men went to work, six of whom were old employees. The Union posted them as scabs and prevailed upon three to quit in the evening.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, March 16, 1893.

9:30 A. M. SESSION.

100 Andes.....	10c	200	.....	1.00
50 Belcher.....	95c	150 Mexican.....	1.50	
300 Bulwer.....	20c	200 Ophir.....	1.50	
100 Chollar.....	60c	50 Potomac.....	1.45	
100 Con. Cal. & Va.....	2.30	200 Potosi.....	1.50	
50 Crown Point.....	30c	300 Savage.....	.55c	
200 Gould & Curry.....	.65c	50 Union.....	.80c	
200 Hale & Norcross.....	1.05			

2:30 P. M. SESSION.

100 Andes.....	45c	100 Hale & Norcross.....	1.05	
100 Belcher.....	95c	50 Mexican.....	1.50	
350 Best & Belcher.....	1.45	100 Mono.....	.50	
500 Bullion.....	45c	150 Ophir.....	1.50	
40 Challenge.....	30c	100 Overman.....	.20c	
500 Chollar.....	65c	300 Potosi.....	1.55	
100 Con. Cal. & Va.....	2.35	300 Savage.....	.55c	
100 Crown Point.....	35c	100 Sierra Nevada.....	.55c	
500 Crocker.....	.50c	50 Union.....	.80c	
200 Gould & Curry.....	.70c	200 Union.....	.80c	
200 Grand Prize.....	.60c	50 Yellow Jacket.....	.35c	

Market Reports.

The Markets.

SAN FRANCISCO, March 16, 1893.

A dispatch from Washington says that Senator Teller has prepared resolutions expressing the sense of the Senate in favor of re-convening the International Monetary Conference at Brussels next summer. Teller says he is satisfied that there has been a change of sentiment in Europe regarding the monetary question since the conference adjourned. It is plain to him that the delegates from European countries began the conference under an erroneous impression as to the policy of the United States. Lately it has been made clear that the purpose of this country was not primarily to reap the benefit of the enhanced price of silver. Recent contributions to the literature on the subject, notably an article published by Professor Andrews, have made it appear that the value of the entire annual silver product is absolutely insignificant as compared with the value of the products in certain lines of manufactures and agriculture.

Along with this statement of Senator Teller's intentions comes a dispatch that Secretary Carlisle will "exercise all the power and discretion invested in him to uphold the credit of the Government and maintain the parity of gold and silver." This statement was made to brush away the rumors about what he contemplated doing, as to issuing bonds or as to paying United States notes or United States Treasury notes in silver when the free gold was exhausted, etc. But here is the Secretary's scheme for maintaining the parity of the metals, according to later advices:

"Secretary Carlisle expects to have ready to present some financial propositions by the time Congress meets which will form a basis of agreement between Congress and the Executive on the vexed financial problem. The men who have talked with him on the subject say that he has a plan well outlined in his mind which will involve the complete organization of the currency system. It will include a repeal of the law compelling the purchase of silver by the Government, and will provide for the deficiency of currency by arranging for a repeal of the State bank tax and an issue of currency by the banks under the State charter under the general supervision of the general Government. The security for the currency will be provided for under the laws of the States requiring the approval of the Government." We give this dispatch for what it is worth.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	@ 14	England, D.	@ 18
BORAX.		Ontario tool,	@ 84
Refined, in car lots ..	@ 71	8 1/2" diam tool ..	@ 15
Powdered, do.	@ 71	Pick & Hammer ..	@ 10
Concentrated, do.	@ 64	Machinery,	@ 5
All grades jobbing at advance.		Toe Calk,	@ 44
COFFEE.		PILGRIM.	
Bolt,	@ 22	B. V. steel grade ..	@ 5 7/8
Sheathing,	@ 22	14x20, spot,	@ 5 7/8
Ingot, jobbing,	@ 141	Charcoal, 14x20, ..	@ 5 7/8
Do, wholesale,	@ 131	Do roofing, 14x20 ..	@ 5 7/8
Fire Box Sheet,	@ 24	Do, do, 20x28,	@ 11 7/8
IRON.		PILGRIM.	
Bar, base,	@ 3	Spot 3/4 D.	@ 24
Norway, base,	@ 41	COAL.	
PILGRIM.		Spot from yard - per ton.	
Eglington, 20 000	@ 20	Wellington,	88 00
Olenburg, 21 000	@ 21	Greta,	7 50
Alamogordo, 22 000	@ 22	Namaimo,	6 50
Alamogordo, 23 000	@ 23	Gilman,	6 00
Oragon, 24 000	@ 24	Seattle,	5 50
Puget Sound, 25 000	@ 25	Ocos Bay,	5 50
Olay Lane White, 26 000	@ 26	Cannel,	8 50
Langdon, 27 000	@ 27	Egg, hard,	12 00
Turnbull, 28 000	@ 28	Cumberland, in sacks, ..	15 00
Carroll, 29 000	@ 29	Do, bulk,	14 00
Barrow, 30 000	@ 30	Walsend,	7 25
Carroll, 31 000	@ 31	Scotch Splint,	7 50
CHROME IRON ORE.		Brymbo,	7 50
Per ton, 32 000	@ 32	West Hartley,	5 00
LEAD.		TO LEAD.	
Pig,	@ 41	Australian,	6 37 1/2
Bar,	@ 41	Liverpool Steam,	6 50 1/2
Sheet,	@ 71	Scotch Spinn,	6 00 1/2
Pipe,	@ 62	Lehigh Lump,	11 00 1/2
SHOT.		Cumberland,	12 00 1/2
Drop, sizes smaller than		Egg, hard,	10 00 1/2
B, 1/4 of 25 lb.,	\$1 80	West Hartley,	5 00 1/2
Do, B and larger sizes ..	2 00	COKE.	
1/2 bag of 25 lb.,	2 00	England, to load, 39 60	10 00
Buck, Balls and Chilled		Do, spot, in bulk,	6 10 00
do, 1/2 bag of 25 lb.,	2 00	Do, in sacks,	6 11 50
QUICKSILVER.		Cumberland,	9 50 1/2
Home trade, pr.	41 50 @ 42 00		
For export,	35 50 @ 36 00		

Eastern Silver Markets.

NEW YORK, March 16.—Following are the closing prices for the week:

Silver		Copper		Lead		Tin	
Thursday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	
Friday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	
Saturday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	
Sunday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	
Tuesday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	
Wednesday	38 3/4	83 1/2	80 3/4	87 3/4	22 1/2	10	

Mining Share Market.

Mining stocks continue dull, both as to price and volume of business. At Virginia a draft of 35 men was made Monday from the force employed in the Savage mine and a draft of 10 from the Belcher. The draft will result in the suspension of ore extraction from these mines, which have been jointly producing about 4000 tons monthly. The failure of bullion returns of ore to cover the cost of production and of the shareholders refusing to pay the assessments levied to defray the operating expenses are given as reasons for the curtailment in the number of employees.

At the annual meeting of the stockholders of the Chollar Mining Company 95,101 shares were represented and the following officers elected for the ensuing year: A. K. P. Hannon, president; Thomas Cole, vice-president, and E. F. Barrett, Thomas Anderson and D. C. Bates, directors. C. E. Eliot was re-elected secretary and A. C. Hamilton, superintendent. The secretary's financial statement showed an indebtedness of \$11,983.70.

Three new mining companies have just been incorporated to mine for precious metals and reduce gold and silver-bearing ores in the new mining district of Vanderbil in San Bernardino county.

The mines are situated on what is now known as the "Bonanza ledge," at the town of Vanderbil,

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		NO. AMT. LEVIED, DELINQ. AND SALE.		SECRETARY.	
Bainbridge Placer & Gold M Co, California	1	40	Jan 23, March 8, April 5	R George, 419 California	
Belcher M Co, Nevada	45	50	Feb 8, March 14, April 4	C L Perkins, Mills Building	
Bodie Cons M Co, California	15	250	Feb 13, March 20, April 17	H D Walker, 309 Montgomery	
Brunswick Cons M Co, California	5	25	Feb 23, March 20, April 10	J Stadfeld, 309 Montgomery	
Caledonia M Co, Nevada	45	100	Jan 23, March 2, March 23	A S Grob, 419 California	
Challenge Cons M Co, Nevada	14	200	Feb 11, March 16, April 6	C L McCoy, Mills Building	
Cons St. Gotthard G M Co, California	7	100	Feb 9, March 17, May 6	T Wetzel, 320 Sansome	
Crown Point M Co, Nevada	60	250	Feb 23, March 30, April 20	J Newlands, Mills Bldg	
Debris M Co, California	3	100	Jan 8, March 2, March 24	A S Grob, 419 California	
Debris M Co, Cal.	3	100	March 8, April 12, May 3	D F Hunt, 14 Sansome	
Edith M Co	3	20	Feb 10, March 17, April 7	O Tum Sudeu, 216 Bean	
El Leopold M Co, Mexico	1	50	Jan 20, March 2, March 28	J Howes, 214 Pine	
Eschbacher M Co, Nevada	35	100	Jan 20, March 1, March 22	C E Elliott, 309 Montgomery	
Eschbacher M Co, Nevada	35	100	Jan 20, March 27, April 24	H D Walker, 309 Montgomery	
Flora M Co, Cal.	2	50	March 9, April 27, May 15	D M Kent, 330 Pine	
Flora M Co, Cal.	2	50	Jan 27, March 6, March 20	J W Lew, 310 Pine	
Imperial Cons M Co, Nevada	1	20	Feb 1, Mar 15, April 5	R J Simmons, Nevada City	
Imperial Cons M Co, Nevada	1	20	Feb 20, March 27, April 24	H D Walker, 309 Montgomery	
Morgan M Co, California	10	100	Jan 23, March 6, March 30	L C Breake, 234 Montgomery	
Nevada Queen M Co, Nevada	8	100	Jan 23, Feb 27, March 30	R K Grayson, 331 Pine	
North Belle Isle M Co, Nevada	22	100	Jan 26, March 3, April 3	J W Lew, 310 Pine	
North Oronoquah M Co, Nevada	4	100	Jan 26, March 3, April 30	J W Lew, 310 Pine	
Ophir M Co, Nevada	59	100	Mar 7, Apr 21, May 1	E B Holloway, 309 Montgomery	
Pier M Co, Arizona	14	50	Jan 2, Feb 24, March 21	A Waterman, 309 Montgomery	
Pier M Co, Arizona	14	50	Jan 20, Feb 24, March 22	A Waterman, 309 Montgomery	
Sierra Nevada M Co, Nev.	104	250	March 9, April 12, May 1	E L Parker, 309 Montgomery	
Silver Hill M Co, Nevada	32	50	Feb 14, March 20, April 10	D O Bates, 309 Montgomery	
Union M & M Co, California	1	50	Feb 15, March 20, April 5	N Withrow, 323 Front	
Terra M Co, Mexico	10	100	Feb 24, April 1, April 19	K J Willata, 309 Montgomery	
Yellow Jacket M Co, Nev.	54	250	March 10, April 14, May 19	W H Blauvelt, Gold Hill	
COMPANY AND LOCATION.		MEETING.		DATE.	
Germania Lead Works, Utah	Annual	J M Quay, 124 Sansome	April 5		
Phoenix M Co	Annual	J Bots, 155 Sansome	April 3		
COMPANY AND LOCATION.		AMOUNT.		DATE.	
Butter Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20		
Champion M Co, California	10	T Wetzel, 310 Pine	Dec 15		
Copier New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15		
Great Western Quicksilver M Co	25	A Halsey, 323 Montgomery	Oct 8		
Mayflower Gravel M Co, California	23	D M Kent, 330 Pine	Dec 40		
Pacific Coast Borax Co, California	1 00	A C Chough, 309 Montgomery	Jan 10		
Standard Cons M Co, California	10	W Lew, 310 Pine	Dec 30		
COMPANY AND LOCATION.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Butter Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20		
Champion M Co, California	10	T Wetzel, 310 Pine	Dec 15		
Copier New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15		
Great Western Quicksilver M Co	25	A Halsey, 323 Montgomery	Oct 8		
Mayflower Gravel M Co, California	23	D M Kent, 330 Pine	Dec 40		
Pacific Coast Borax Co, California	1 00	A C Chough, 309 Montgomery	Jan 10		
Standard Cons M Co, California	10	W Lew, 310 Pine	Dec 30		

and they cover 3000 feet of the mining ground that W. S. Lyle and George R. Wells, the well-known mining men of this city, have been working for the past six months under bond from the original discoverers.

Within the past three weeks John W. Mackay and James L. Flood have bought an undivided half in the property, and the new mining incorporations now referred to have been formed to carry on the business of developing this new mineral deposit.

The capital stock in each of the three mines is \$10,000,000, divided into 100,000 shares of the par value of \$100 each. The companies are named the Gold Bar, the St. George and El Rey d'Oro. The stock in each of the companies is divided up as follows: James L. Flood, 24,000 shares; George R. Wells, 25,000 shares; Wm. S. Lyle, 25,000 shares; John W. Mackay, 25,000 shares and James E. Walsh, 100 shares.

Work is now being actively prosecuted on this group of mines, and the erection of a mill will commence within a few weeks.

Judgment for defendants has been given by Judge Slack in the case of Oscar Steel against M. W. Fox and other directors of the West Consolidated Virginia Mining Company. It is held that the 23,190 shares of stock, and no more, rightfully belong to Steel, and that no fraud has been committed by Fox and his associates. This is practically a victory for Fox.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 7 1893.

- 492,952.—FRUIT GATHERER.—S. F. Ball, Winters, Cal.
 - 492,953.—CAR LAMP.—Emile Boesch, S. F.
 - 492,954.—CAR LAMP.—Emile Boesch, S. F.
 - 493,148.—MACHINE FOR DRESSING TOBACCO.—Henry Bohls, S. F.
 - 493,208.—VAGINAL STRING.—A. B. Crickshank, S. F.
 - 492,957.—MEASURING VESSEL.—E. L. Detrick, San Francisco, Cal.
 - 493,157.—REFRIGERATOR.—Gardiner & Millins, Spokane, Wash.
 - 492,865.—ILLUMINATING TILE.—H. Hanstein, S. F.
 - 492,803.—PACKING VESSEL.—H. C. Hunter, Alameda, Cal.
 - 492,804.—PACKING.—H. C. Hunter, Alameda, Cal.
 - 492,805.—SIDE SEAMING STAFF FOR CANS.—H. C. Hunter, Alameda, Cal.
 - 492,806.—PACKING VESSEL.—H. C. Hunter, Alameda, Cal.
 - 492,962.—GRINDING PAN.—J. H. Kinkead, Virginia, Nev.
 - 493,097.—VEHICLE HUB.—L. C. Lahady, Tacoma, Wash.
 - 493,103.—ROTARY SICKLE CUTTER BAR.—J. S. Mathens, Pendleton, Or.
 - 493,179.—RAILWAY SWITCH.—Richard Nash, Ellensburg, Wash.
 - 492,965.—KILN.—J. O. Neil, Sacramento, Cal.
 - 492,945.—CHURN.—J. Phegley, Harrisburg, Or.
 - 493,223.—CHEERNS, DRAFTS, ETC.—J. F. Shafer, S. F.
 - 493,125.—ELECTRIC R. R. DANGER SIGNAL.—Paul Seiler, S. F.
 - 493,128.—MUSIC BOARD.—H. S. Sharpe, Seattle, Wash.
 - 493,129.—CAM FOR STAMP MILLS.—G. A. Thompson, Tombstone, A. T.
 - 22,270.—DESIGN FOR CAN.—M. J. Kinney, Astoria, Or.
 - 22,263.—DESIGN FOR TYPE.—G. F. Schroeder, Mill Valley, Cal.
- The following brief list by telegraph, for Mar. 14, will appear more complete on receipt of mail advices:
- California.—Seneca L. Berry, San Francisco, water-wheel; Theodore Bessing and W. A. Barker, Los Angeles, display shelf and carpet elevator; John W. Criles, Sacramento, vending machine; Charles W. Hinton, Los Angeles, car coupling; Rebecca E. Hooper, San Francisco, guide shield for type-writing machines; Benjamin Mattress, Schriener, stump-extractor; Mary E. Prescott, San Francisco, mop-wringer; Henry Scaake, San Francisco, cap-making machine; Walter N. Sherman, Merced, adjustable ventilating canopy frame for heds; Jacob

F. Shultz, San Jacinto, plow shovel; Robert Steedman, Berkeley, setting gauge for door frames; Geo. H. Tjelen, San Francisco, apparatus for transferring or stenciling upon transparent or other material; John N. Tilgney, San Diego, adjustable support for bracket tables; Emory L. Townsend, Los Angeles, manufacture of hose couplings.

Washington.—Henry M. Hoyt, Spokane, copying press; James R. McGregory and G. O. Perry, Centralia, nautical signal.

Gravel.—Robert D. Hume, Gold Beach, machine for forming can bodies; Thomas J. Snyder, Wallawa, hay-loader; James M. Wallace, Portland, fire ladder.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAR LAMPS.—E. Boesch, S. F. Nos. 492,953 and 492,954. Dated March 7, 1893. These inventions relate to such lamps as are used on railway, street and other cars. One of them consists in certain details of construction by which the inventor is enabled to produce a downward draft of air exterior to the lamp-chimney, said air passing through openings in the burner, thence upwardly within the chimney and its extensions. It also equalizes these two drafts against any sudden jars or shocks so as to prevent the lamp from smoking or burning irregularly. It further consists in a means for introducing and supporting the oil-fount from the lower part of the lamp-body; a cover or drip-cup with air-circulating spaces, and means for making a tight joint between the oil-fount and the lamp-body; and an improved means for supporting and steadying the lamp-chimney. The other patent covers certain details of construction in the class of lamps which are fixed to the ends of a car to light the car lengthwise, and are so constructed as to light also the platform with the same burner.

MEASURING VESSEL.—E. L. Detrick, Susanville, Lassen Co. No. 492,957. Dated March 7, 1893. This is a combined containing and measuring device for liquids. It consists of a receiver, with means for delivering the liquid therefrom, a tilting measuring device journaled with relation to the receiver so as to be filled therefrom, and be discharged without removal.

CONTINUOUS BRICK KILN.—James O. Neil, Sacramento. No. 492,965. Dated March 7, 1893. In the construction and operation of continuous kilns a circular or elliptical structure is formed, having chambers extending all around adjacent to the exterior wall and an interior passage into which smoke and products of combustion are led from the burning chambers and from thence up the chimney. The kilns are usually built up of brick and have the continuous series of chambers extending around the whole circumference. These chambers have suitable doors or entrances at the sides through which the bricks are set in the kiln for burning and afterward removed. During the process of burning, these exterior doors are closed and not opened until it is desired to remove the bricks. Mr. Neil's improvements are mainly in details of construction. He is enabled to convey away a greater portion of the moisture which is in the bricks when they are first set in the chamber, and prepare them for the further application of the drying heat, and the bricks are thus gradually prepared for burning.

ELECTRIC RAILROAD DANGER SIGNAL AND BELL.—Paul Seiler, S. F. No. 493,125. Dated March 7, 1893. The object of this invention is to provide a proper danger signal and utilize the present construction of trolley wires and electric-power current to operate danger signals in the shape of bells, lights, semaphores or other devices at street-crossings or other places to announce the approach of trains or cars. In this device it is not necessary to maintain batteries to operate the lights or bells, but the current which operates the cars is utilized by

means of an attachment on the trolley-wire insulator and a support which carries the mechanism to be operated by the trolley of the passing electric car. This attachment can be placed at a suitable distance away from the crossing to announce the approach of a car, and another attachment placed at the crossing to stop the bell or operate the signal at a car.

FRUIT-GATHERER.—Samuel E. Ball, Winters, Yolo Co. No. 492,952. Dated March 7, 1893.

This is one of that class of fruit-gatherers in which an expandible and collapsible receiver is adapted to encircle the tree trunk. The object of the invention is to simplify the carrying device of the receiver, rendering it possible to transport it and to manipulate it with less labor and fewer hands, and at the same time providing for all necessary adjustments to suit the lay of the land.

Assessment Notices.

SUPERIOR MILL AND MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Placerville, El Dorado County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 15th day of February 1893, an assessment (No. 1) of five cents (5c) per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, Room 2, No. 323 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 20th day of March, 1893, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 5th day of April, 1893, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
I. N. WITHROW, Secretary pro tem.
Office, Room 2, No. 323 Front St., San Francisco, Cal.

POSTPONEMENT.

At a meeting of the Board of Directors of the Superior Mill and Mining Company held on the 28th day of February, 1893, the day of delinquency in the above assessment was postponed to April 3d, 1893, and the day of sale to MONDAY, April 24th, 1893, at the same hour and place.

FALL RIVER CONSOLIDATED GOLD QUAKIZ MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Plumas County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of February, 1893, an assessment (No. 10) of two cents (2c) per share, was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 313-315 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 23d day of March, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 17th day of April, 1893, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
ADOLPH LOESBACH, Secretary.
Office, 313-315 Front St., San Francisco, Cal.

Books on Assaying.

BY C. H. AARON.

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Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expeditives; Assay Tables.

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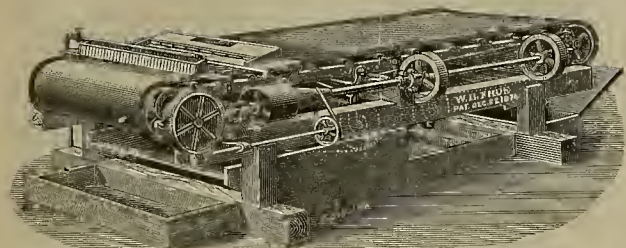
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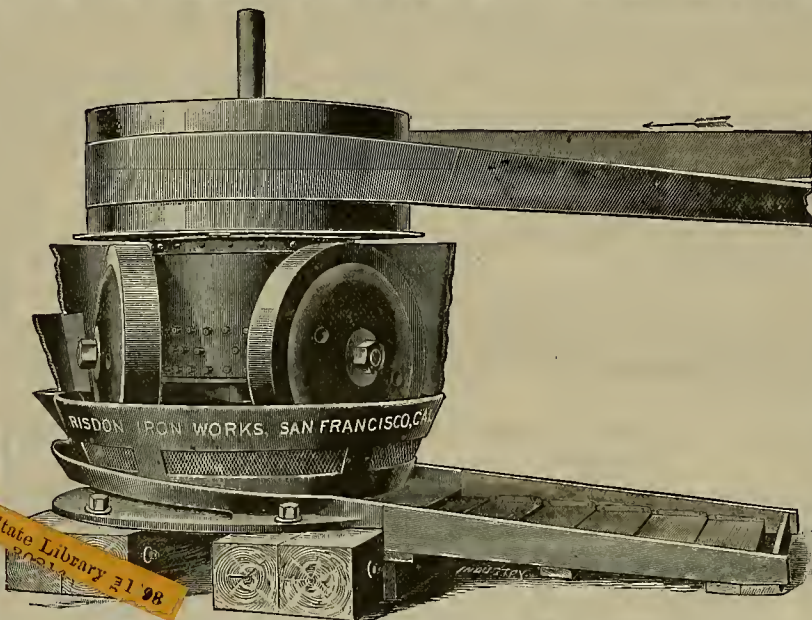
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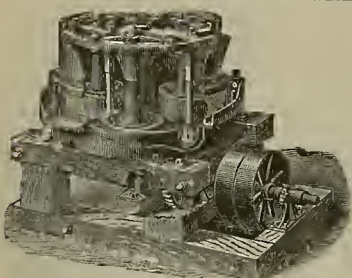
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VOL. LXVI.—Number 12.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 25, 1893.

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A Power Plant for Seattle.

B. T. Lacy, President of the Parke & Lacy Co., of this city, has filed a notice of a claim to the water of Snoqualmie falls, Wash., for the purpose of generating power to be transmitted by electricity to the towns between the falls and Seattle. Mr. Lacy intends to divert the water by partially damming or bulkheading, and connecting it by a pipe-line to impact water-wheels below the falls. The power of Snoqualmie falls is sufficient to operate all the machinery and all the street railways in Seattle, as well as that in other towns on the line. A number of Pelton or Dodd wheels will be placed at the foot of the falls and will transmit the power to shafting which will convey it to an electric plant on the banks. From these dynamos the electric current will be carried in an almost air-line to the city, where the current will be distributed by smaller wires to the points where it is to be used. The line will pass through Gilman, Newcastle and Renton, situated at different points between the falls and Seattle, and at each place power will be supplied where wanted.

The Snoqualmie falls are distant from Seattle 18 miles in a direct line, but the line of wire will probably be 23 miles, owing to the presence of a lake in the direct line. The drop of the water at the falls is 268 feet, and from 10,000 to 15,000 horse-power can be obtained all the year round. Mr. Lacy has not worked out all of the details of the plan, but is now in consultation with the electricians as to the feasibility of the scheme. A company will be formed to build and operate the plant, which will require the expenditure of about a million dollars. Cheap power can be supplied for sawmills, railroads, pumps, etc., and light and heat be obtained also. The possibilities of the enterprise are very great. The water, after being utilized in the wheels, will be returned to the river, or some of it may be used for irrigation purposes.

It is stated that the Snoqualmie falls present the feature of the greatest volume of water falling perpendicularly from such a height—268 feet—in the United States. The engraving on this page, made direct from a photograph, gives a view of the falls. It will be seen that there is a large body of water and a splendid opportunity to utilize it on "hurdy-gurdy" wheels, such as are in common use here with high heads. Mr. Lacy's scheme seems entirely practicable. Electric power has been carried much farther than the distance necessary here. The well-known example of the Frankfort-Lauffen experiment showed the current could be made available for a distance of 107 miles. Of course, in that instance great care was exercised in the whole installation; but it showed what may be done. The greatest distance on the Snoqualmie falls scheme is 26 miles.

Seattle is destined to become a great manufacturing cen-

ter as the city grows, and already there is sufficient demand for power to make an enterprise such as this pay. In addition, there are the smaller towns on the line to be considered.

If rumors are true the famous old camp of Aurora, Nev., will see a revival this summer. The news is that capital has been raised to resume work on the Oon. Esmeralda mines in that camp. It is the intention to run a long tunnel and drain the mines several hundred feet below the



SNOQUALMIE FALLS, WASHINGTON.

present workings. Electrical developments have something to do with this for they intend if the showing warrants, to put up a mill to be run by electricity, this to be transmitted from dynamos on Walker river. Aurora was a most famous camp in the old days, but went out of sight. There was a revival a few years ago but it was temporary only. Many never lost faith, however, and will be glad to see money spent there intelligently this year. The existence of large and paying bodies of ore may be proven.

It is not probable that there will be any Mechanics' Institute Fair this year.

Distinction Between Geology and Mineralogy.

Although the two sciences are so intimately connected that the two terms are often used synonymously there is in fact a wide distinction. To give definitions in the simplest form of words, Geology treats of the structure of the earth and the changes it has undergone from its creation out of chaos to the present time; Mineralogy describes in detail the various component parts or substances of which terrestrial matter is formed, and declares the forms, properties and qualities of those substances. For instance, the geologist, in passing by a deep railway cutting, or descending the shaft of a mine, possibly finds a stratum of rounded pebbles, and knows that they have acquired that form by friction, as they have been driven over rocks or against each other by moving water in some bygone age.

The mineralogist examines the component parts of the stratum, and finds that the pebbles are composed of granite, quartz, greenstone, etc. Again, the geologist observes that a deposit of a bluestone or lava, many feet in depth, has overlaid thick beds of sedimentary rocks, or a drift of pebbles and gravel, and knows that the lava was once in a molten state and ejected from a volcano at some period of the world's history. The mineralogist observes the character of the lava. He finds it is of that specific kind called "amygdaloidal" basalt from the almond-shaped cavities in the mass, and he possibly finds some crystals of olivine in those cavities. The mineralogist then declares the value of the basalt for its toughness and durability as a building stone or metal for roads, and of the olivine as an ornamental gem, known as crysolite. In short, it is the object of mineralogy, as well observed by Prof. Ansted, to describe the form, the internal structure, the chemical composition, the physical properties and the uses to man of all those natural material productions or substances which are not organic, i. e., which do not possess vitality or the power of reproduction like animals and plants.

THE Johannesburg (South Africa) gold mines yielded 1,290,000 ounces in 1892 and expected to turn out 1,600,000 ounces this year. At the

beginning of 1892 the number of stamps at work was 1540, and at the close of the year 2035. There was, however, a decreased yield per ton from the mill of 1.36 dwts., attributable to the compulsory working of lower grade ores; but the total yield from all sources averaged 12 dwts. 13 grs., against 12 dwts. 5 grs. in 1891.

THE growing activity in building is illustrated in the lists of recorded contracts. In the past six working days thirteen contracts were recorded, representing a pledged outlay of \$291,080. Last week fifteen contracts were filed, amounting to \$47,330.

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W. B. EWER, }
 CHAS. G. VALE, } EDITORS

Our latest forms go to press on Thursday evening.

Entered at the C. F. Postoffice as Second-Class Mail Matter.

San Francisco, March 25, 1893.

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Comment.

The chief of the Mines Department of the World's Fair, Mr. Skiff, says that it is assured that in the Mines and Mining Building will be gathered in 1893 incomparably the largest array and most complete and most instructive evidence of the mineral wealth and progress of the mining industry ever collected or attempted. This is the first time at any great exposition that there has been a special separate department of mining. The mineral exhibits will have a special building with a floor space of about nine acres. We are rather sorry that there has not been more interest in the California part of the exhibit than has thus far been shown. Were it not for the already collected specimens of the State Mining Bureau, we should make a poor showing. Even now we have no hope that the California portion will come up to what it should. There have been no systematic efforts to cover each county in the State. The Commission set aside for mining \$15,000 which was afterward, if we are rightly informed, reduced to \$8000, and most of this will be spent on salaries, etc., during the exhibition. There was not enough spent on making the necessary collections and preparations. Had a special superintendent been chosen months ago and given nothing else to do, there could have been made the finest exhibit of any State in the Union.

In a recent number of the PRESS we gave the reasons for the closing down of the Bunker Hill and Sullivan mines in the Cour d'Alene district, Idaho, and predicted that other mines would have to close unless the conditions were changed. Other smaller mines at Wardner have since stopped work and now the Morning mine at Mullan has followed suit. This is a rich mine, making a large production and employing a good force of men. It is unfortunate for the region that the railroad companies persist in maintaining such high freight rates in the face of reduced prices of silver and lead. The mines cannot stand such rates. It is impossible for them to continue. At present the mines are being worked mainly at a profit to the railroad companies. The situation is not pleasant, especially to the working miners, who are thrown out of employment.

It is stated that Secretary Carlisle will try the experiment of outside competition for architectural designs for some of the important public buildings shortly to be erected. These designs have heretofore been made by architects in the Government service. None of these gentlemen seem to have any ideas respecting the necessity of light. The interiors of their buildings are as dark as jails and the exteriors more like warehouses than anything else. At least, that is the experience in this city. It will be a

relief to see a handsome Government building, well lighted and airy. The new postoffice at Sacramento is a notable exception as to appearance, for it is really attractive; but our Appraisers' Building, Treasury and Mint in this city are expensive structures with no elements of beauty in design. It is a hopeful sign that "outside" architects may compete in this matter, for we are apt to have something worth while in the new buildings which the Government is to build.

It is expected that the consumption of copper in the United States this year will be exceptionally heavy, especially for electrical purposes. The rapid development of electrical processes and plants has been of great benefit to the copper miners in recent years, greatly increasing the demand for the metal. It is probable that electrical transmission of power will be more generally adopted in the future and many plants will be built. All of these plants add to the demand for copper. The English consumptive demand for copper of all descriptions has decidedly improved of late, and were the market to display more signs of stability there is little doubt that this demand would further develop. A committee has been appointed by the American producers to negotiate with the European producers for a continuance of the present arrangement—which lasts to the 30th of June—and as it has hitherto worked very smoothly and satisfactorily, it is fully expected that it will be continued for a further period. Although it has not so far led to any improvement in the value of copper, it has prevented the serious fall we might otherwise have experienced from excessive production, and has therefore proved advantageous to all the parties to the agreement.

The Riddles nickel mine, Oregon, is reported sold to an English syndicate. A reduction plant was recently put up but was not started. It is to be hoped that the rumor of the sale is true, but the English owners of the Canadians' nickel mines already have more metal than they want. They cannot sell all their products, the demand being limited. If it can be produced cheaper here than in Canada, it would be all very well, but this is doubtful, to say the least.

At a meeting of the Executive Committee of the State Miners' Association on Thursday a handsome gold watch and chain with a diamond locket and gold pencil was presented to Senator T. L. Ford; and a gold chain with locket was given to Assemblyman Thomas of Nevada county, in recognition of their services in the miners' cause during the recent session of the Legislature. The gifts were entirely unexpected but well deserved. Both gentlemen labored hard for the miners' interests during the entire session, and their friends will be pleased to learn of these handsome marks of appreciation having been presented to them.

California Chrome Ores.

The condition of the chrome ore industry in California is not very satisfactory owing to the great distance from the centers where the ore is utilized, the cost of freights to said markets, the desultory system by which the mining is carried on, and the rate of the tariff on foreign ore. The dealers contend that at the present tariff it is almost impossible for them to compete with the foreign article. Moreover, the richer ores from those deposits within any reasonable distance from railroads, have already been taken out and shipped, leaving the poorer ores until the conditions will permit of their being profitably mined and shipped.

It is well known that there are many good deposits of this material in the Coast and Sierra ranges of mountains which cannot at present be utilized because of their distance from railroads; and the uncertainty of extent of such deposits prevents their being developed and roads opened to them. In fact with those already opened it is as much a question of building roads as one of opening mines. In nearly all instances roads must be built to the deposits so that the mined material may be hauled out. Oftentimes these roads alone have cost more than was obtained for the mineral mined, and when the deposit has been worked out the road is of no value whatever. Thus far those deposits which have been mined have been those most accessible, the others being left for future use.

Another drawback to this class of mining is the fact that the general grade of the ore is not up to the standard required in the markets. What is wanted is 50 per cent ore while the general average of the California ores may be stated at about 45 per cent. Works have been established in Alameda county where the ore is brought up to the standard by a system of concentration, but this naturally adds somewhat to the expense. When the grade of the ore is high there is no difficulty in the sale but much of it offered will not come up to the required standard.

The ore does not occur in defined fissures or in large de-

posits. Tracts of land containing chrome may have a dozen or so deposits in irregular bunches or masses of greater or smaller quantity. When the miner starts in to work a deposit he can have no idea of its extent and he often takes out only forty or fifty tons when his deposit becomes exhausted. Again, a thousand or more tons may be taken from one place. Moreover, the ore does not always keep at the same grade, and while the miner may take out a quantity of standard grade ore the rest of the deposit will fall below this and be practically valueless. It is a most uncertain kind of mining.

Those engaged in the business do not follow it as do miners of other materials. When freight rates fall to a certain figure the men will get out as much as they can and sell it to the dealers. When freight rates rise again they stop work on the mines and take up other occupations.

It often happens that a whole district will be very busy for a time and then work will cease for months or years. The men work at the bunches or small deposits, generally paying a royalty to the owner of the land. Various small lots of ore are scattered over the field and these the buyers for the Philadelphia or Baltimore firms purchase from the miners, and ship at convenience. Again, these buyers work the deposits themselves and collect the ore. They often arrange with a set of miners to take out ore from certain deposits, building roads themselves to get the product to the market, and paying the miners a fixed rate per ton for what is mined. There is more or less risk in this, of course; but the miners are generally poor men with no capital to invest in such a business. It is not as if the miners owned the ground and worked it the same as a gold or silver claim. They may take up a claim and work it out, but the deposits are of such uncertain extent and value that there is little or no permanency to such a mine, if mine it can be called.

There are instances, such as the Pick and Shovel mine in San Luis Obispo county, where the same claim has been worked for years, off and on; but that is only worked by one or two men, who mine in it after a desultory fashion. Occasionally they get out a batch of fifty or so tons of good ore, and then work on a small seam or stringer for a long time before they come to a bunch of any value. On making a "stake" from a hundred tons or so they abandon the mine for the time being, until they feel like again working it. Chrome ore mining is really a species of "pocket mining," since the deposits so often occur in small bunches, and the pocket being worked out the location is abandoned and a new one sought near by.

Foundry Notes.

THIS State is largely dependent on British Columbia for a coal supply. The coal imports from there have increased from 32,300 tons in 1873 to 427,900 tons in 1892. The largest imports were in 1891, when there arrived by sea in San Francisco 521,400 tons of British Columbia coal. The output of the Vancouver mines employs a considerable amount of tonnage belonging to the port of San Francisco. Of late years steam colliers have taken the place of sailing vessels, and they are kept constantly moving up and down the coast. The arrangements for loading and discharging admit of rapid dispatch and little time is lost. Duty is of course paid on this coal, and the local foundrymen are anxious to see this removed. A petition has gone on to Congress asking for the removal of duty on foreign coal and iron, signed by all the iron manufacturers here. It seems unfortunate that California, which is so well supplied with so many other mineral substances, should be lacking in coal deposits. What little coal we have is of poor quality.

THE New York Times has been publishing some foolish yarns about the failure of the boilers of the Monterey, and other newspapers have printed corresponding paragraphs, arguing that the ship is a failure. Nothing could be further from the truth. At the time of the official trials there were on board the Monterey the following eminent officers: Admiral George Brown, Chief Engineer S. F. Kutz, Captain Louis Kempff, Chief Engineer George Burnap, Chief Engineer Joseph Tulley, Commander B. C. Pendleton, Lieutenant J. W. Carlin, Lieutenant B. F. Nicholson and Naval Constructor Taylor. The board had a number of other Government engineers to assist them. All during the trial trip there were two Government engineers at each boiler keeping watch, and if anything had gone wrong it would have been reported. They forwarded all their reports, going even as far as to send the private notes made, and after considering the subject fully and examining all the reports, Chiefs Melville and Wilson, of the Navy Department at Washington, made a report in which the following passage occurs:

"From a careful study of the data received from the trial board and of the notebooks of the assistants engaged, we are of the opinion that, with proper firing and attendance on the machinery, a sustained power of at least 5400 I. H. P. can easily be maintained for four hours, and we consider the department fortunate in obtaining the vessel at a reduced cost and without injury to the boilers, that is sometimes caused by a contractor forcing them to the uttermost during a trial to gain premiums for increased power."

From this, it will be seen that the Government found the Monterey's boilers to be in good condition, and this is

proved by the way she has since borne up under high steam pressure.

The Monterey is in perfect condition and ready to go to sea at any day. The publication in the Eastern paper is very unjust to the Union Iron Works of this city, having no foundation whatever in fact. In any event, the Ward boilers were not made by these works, but were ordered in the East by the Government and supplied to the vessel. But they work all right anyhow, and there is no fault found with them. The Monterey was designed to have two Scotch and four tubular boilers of the type which proved best upon an experimental trial. The conditions of this trial were thoroughly advertised, and all builders of tubular boilers were requested to forward types of their boilers to the navy yard at Brooklyn, where they would be correctly tested by a board, of which ex-Engineer-in-Chief Loring was president. Of the boilers submitted for trial the Ward boiler proved the best in every respect, as experience on board the Monterey has justified.

It is stated that there is talk of a small rolling mill being established in Los Angeles. Mr. Chamberlain came there from the East at the solicitation of Mr. A. S. Robbins of Los Angeles, to investigate the matter. He considers the situation favorable for a mill which should make 10,000 or 12,000 tons of ore annually. Mr. Chamberlain says:

"The estimated cost of such a rolling mill is in the neighborhood of \$150,000, and it will be designed to make all kinds of light plate and sheet-iron from a quarter-inch thick down to the thinnest stove-pipe iron, and all kinds of bar iron and angle iron except the very large sizes, also small T-rail. When the mill runs to its full capacity it will employ from seventy-five to one hundred men, and it will be so arranged that, if the market demands, additional machinery can be easily added. I find there is brought into southern California yearly a much larger amount of iron than this mill can make and the demand is rapidly increasing. The material used in the manufacture of this iron will be old iron rails, wrought iron scrap and a soft or low carbon steel, and to some extent, old steel rails which we expect to get largely from territory tributary to Los Angeles. In regard to competition? Well, for merchant iron competition will come from San Francisco and the Eastern States; for sheet iron, entirely from the East, as there are no sheet iron mills on the Pacific Coast, consequently there will be a large field in which to sell this part of the mill products. The high price of coal will effect the industry to some extent, but crude petroleum is now being extensively used in the East with great success and economy in heating iron in heating furnaces and under boilers. This is being done where coal can be bought for from 75 cents to \$1.30 per ton and oil at 65 to 75 cents per barrel. We shall use oil in our beating furnaces and probably for generating steam. The company has been started under the name of the Los Angeles Iron and Steel Company, with a capital of \$150,000, and the following Board of Directors has been elected: F. N. Myers, A. S. Robbins, J. H. Harris, Damerall and C. D. Pillsbury, who have organized by electing F. N. Myers president and treasurer; A. S. Robbins, vice-president; W. B. Smith, secretary. Seventy thousand dollars has been subscribed, and the balance of \$80,000 will probably be placed in the next 15 days. The mill will probably be in operation by October 1st, and the annual payroll will, if the mill is run on full time, be over \$50,000, and the value of the manufactured iron will be about \$500,000.

A SHIPMENT of 251 tons of armor, forming the plates of the battleship Oregon, left the Bethlehem (Pa.) Works this week for the Union Iron Works, San Francisco, where the Oregon is being built.

Mining Briefs.

TIN sells in England just now at £92 5s per ton.

ANTIMONY is selling in Liverpool at £41 per ton.

SULPHATE OF COPPER continues in poor demand in England at £15 10s for early delivery.

AMERICA is sending more copper to Liverpool and Swansea than Chile does. In the first two months of this year we sent over 4107 tons while Chile sent 3428 tons.

THE Phoenix Mining Co. (A. T.) is going to build a large dam to store water, with which to hydraulic the mountain of earth in which its ledges lie. The dirt carries free gold.

THE steamer Dora, from Alaska, brought down 100 tons of concentrates from the Apollo mines on Unga island. This vessel went up from here February 10th and took miners and supplies to these mines. Forty men are at work.

THE Alaska Treadwell Mining Company proposes to have thirty bars of gold, or rather their counterfeits, exhibited at the World's Fair as part of the Territory's representation. The original bars are valued at about \$800,000, and represent a year's product of the mine on Douglass island.

SOME men are "mining" out on the ocean beach for a cheat supposed to be filled with the gold of early Spanish voyagers. They have been several weeks sinking a shaft through the sand. Like some other claims we have heard of, most of the mining appears to be done in the newspapers.

P. J. COLE has returned to Phoenix, A. T., from the Plamsa mountains, and says there is plenty of rich float, but no defined ledges have been struck. The formation is slate, with narrow seams of quartz, and all the water used has to be hauled for miles, therefore he advises burro prospectors not to attempt the trip.

WILLIAM AND LEM JONES, two brothers engaged in mining on Olney creek, six miles from Redding, Shasta Co., while making a cleanup of their placer diggings, found two lumps of gold worth \$500 and \$200 respectively, besides getting about \$300 in smaller pieces and dust. Their find has created considerable excitement.

Coast Industrial Notes.

THE steamer Crescent City, which left this week for Sitka, carried north nearly fifty tons of black and giant powder to be used in the mines.

AN election on the question of issuing \$30,000 in bonds for the establishment of a sewer district will be held at Fruitvale, Alameda county, on the 15th prox.

THE Board of Supervisors of Shasta county has appropriated \$2000 for a general exhibit of that section's resources at Chicago. The Sacramento county appropriation has been increased by \$1500.

THE trustees of the Moses Hopkins Academy expect to spend \$150,000 in buildings and improvements. They visited Martinez, San Leandro and Haywards during the past week to look at sites that have been offered.

THIS week there were shipped to Chicago two carloads of building stone and marble, composing the ornamental facade which will decorate the entrance to the California mineral exhibit in the national building of Mines and Mining.

THE citizens of Paso Robles, San Luis Obispo Co., have held a meeting to discuss the feasibility of bonding the city for water works and a sewer system. A committee was appointed to look into the matter. The cost of the sewer will be \$60,000 and the water works \$50,000.

THE people of Santa Rosa are raising a bonus of \$25,000 to induce the Wentworth boot and shoe factory to remove to that place from Oakland. Mr. Wentworth, the manager, says that the factory will remain in Oakland if a similar bonus is raised to keep it. The factory employs seventy men.

ARTICLES OF INCORPORATION of the Stockton Power Transmission Co. have been filed by San Francisco men associated with local capitalists, with a capital of \$1,000,000. The company will generate electricity with water-power on the Mokelumne river, forty-two miles from Stockton, and transmit it for sale to manufactories.

THE electric road which will connect Oakland with Alameda will be in operation in a few weeks. The iron poles are all in position and the work of stretching the wires has commenced. The power and car-houses at the west end are being rapidly pushed to completion, and four cars are ready to leave the car-shops in Oakland.

JACKSON, AMADOR COUNTY, is certain to have an electric-light plant. Richard Webb is organizing a local company, and for several days has been soliciting orders for lights and subscriptions for stock in the new concern. Citizens are showing a disposition to encourage and foster the enterprise by liberally responding. Mr. Webb is well satisfied with the result of his efforts and expects to have the town lighted by electricity in a very short time.

UKIAH, MENDOCINO COUNTY, wants a better system of sewerage. At a mass meeting this week it was decided to instruct the Town Trustees to appoint a committee to ascertain the cost of a main sewer from the center of the town to Russian river, a distance of one mile. The committee was further instructed to negotiate for the purchase of a forty-acre lot on the river bank for the location of a cesspool.

THE traffic department of the State World's Fair Commission has been advised that the desired concessions in freight rates upon exhibits shipped to Chicago which were discussed at the recent meeting of the Transcontinental Association at Monterey have been granted in some particulars. A classification of such shipments as "World's Fair exhibits" has been made, and a general rate of 60 cents a 100 pounds has been established. The rate applies to carload lots of a minimum weight of 20,000 pounds to each car.

AT the last meeting of the Mechanics' Institute, the Committee on Library, Rooms and Buildings was empowered to see the architect and have him draw up plans for fitting up the basement of the building on Post street with concrete floors and furniture, so that it may be used as a reading room and for the storing of copies of public records. No action was taken regarding the proposed new library building, except that a committee of five is to be appointed by the chair at the next meeting to ascertain the needs and requirements of the new building and to report a general plan.

IF the city of Oakland opens all its streets to the waterfront as proposed, some of the buildings in the way will have to be removed. These are mainly manufacturing plants. There are the Starr flourmills at the foot of Clay street; the Pacific Nail Works, near the middle of Market street; the gas works at the foot of Grove street; a dozen or more lumber yards in the way of other streets, and the railroad yards obstructing all the streets from Peralta to the point. In the latter some of the streets, if extended, would play havoc with the buildings which stand squarely in the road.

THE large number of idle men that has in most instances been supported by charity during the winter shows no sign of decreasing in numbers in spite of the fact that spring is here, and it was hoped that most of the men would have gone out into the country by this time to look for employment. Inquiry at the charitable institutions shows that the number seems to be still on the increase. At the Salvation Army Lifeboat they serve about 700 to 800 free meals daily. The men who have tried for work in the country report affairs worse than in the city, the towns being full of men waiting for the farmers to begin work on their ranches.

WORK has begun in earnest on the South Gila Canal in Yuma county, Arizona. One hundred men and forty teams are at work on the dam. A \$30,000 pumping plant is being constructed on the mesa to supply the new town of Christoval and the laborers on the canal with water. The canal, with its branches and reservoirs, will irrigate 300,000 acres, and with the dam, which will be of solid masonry, will cost \$2,000,000. The dam will be 50 feet high and 1,400 feet long, and will form a reservoir 11 miles long.

THE canal will be 50 feet wide, carrying 8 feet of water, and will be 125 miles in length. It will take two years to complete the work. Five hundred men will be employed.

THE Bakers' Union, representing 400 members, the Confectioners' Union, numbering 80 members, and other labor organizations have petitioned the San Francisco supervisors to pass an ordinance prohibiting the delivery of bread, cakes and other pastry, by wagon or otherwise, between the hours of 12 o'clock midnight on Saturday and 12 o'clock midnight on Sunday, believing that such an ordinance would be a great boon to the bulk of employing bakers, as well as to their employes, and would work no injury to the general public, because, as they state, bread delivered under such an ordinance would be scarcely more than two or three hours older than bread delivered under the present system.

OUT in the employees' waiting-room of the Sutter Street Railway Company's car-house the recently-enacted law providing for one day's rest from labor out of every seven is conspicuously posted on the bulletin-board, and following the law the company has posted in large letters a notice as follows:

All employees of the Sutter Street Railway Company are hereby notified that if any one wishes to avail himself of the above law, and work but six consecutive days at any one time (except in cases of emergency, as above provided), he will immediately file a written notice to that effect with the superintendent.

Inquiry at the office brought out the information that so far not a single notice had been filed and none were expected. The Sutter Street Company is the only one thus far to take any notice of the law.

JAMES MARTIN, member of Parliament from New South Wales, and Special Commissioner from that country on Manufactories and Manufacturing Processes to the Columbian Exposition, is at the Occidental. On the same vessel on which he came are 500 packages of exhibits for the fair.

As Commissioner of Manufactories he has arrived in time so he can spend a good while in California, examining into the kinds of machinery and inventions used here. He explained that the natural products of California and New South Wales were very familiar. Fruit of all kinds, vines and grain may be produced in immense quantities. Mr. Martin wants to see how California fruits are canned and preserved; how milk is condensed, for dairying is a great industry there; to examine the great harvesting and threshing machines, plows and other implements, and thus recommend to his Government similar things. He will also study the processes of treating ores and the latest mining and reduction machinery.

A LARGE FORCE of men is at work on the foundation of a can-making establishment on the corner of Eighth and Brannan streets. The structure is to be 275 by 206 feet, one story high. The whole thing is to be done in 24 days. The walls are to be of brick, and in addition to the rows of wooden columns supporting the roof trusses there will be a dividing wall of brick in the center. The plans were finished and approved within 48 hours, and bids were at once called for. On Monday all the bids were received, and on Tuesday at noon the contract, amounting to \$22,000 was let to John McCarthy, with the penalty of \$50 a day forfeit for every day longer than the 24 allowed within which to complete the building and turn it over. It is estimated that between 50,000 and 60,000 bricks a day will have to be laid, and then there will only be three days' time for putting on the roof. The building is intended for a can-making establishment, and the reason assigned for the hasty construction is the failure of the Eagle Automatic Can Company to secure a renewal of its lease for its present quarters. Alvinza Hayward is the owner of the site and building, and as the land is not over-firm, the foundations have to be more elaborate than usual for such a structure.

THE steamer Mexico, the second one of the North American Navigation Co.'s vessels, which are carrying California freight to Panama on the way to the East, will take very much the same kind of cargo that the St. Paul did, only the amount will be twice as large. The freight includes several hundred barrels of California wine, including port, claret, sherry and white wines, and a large quantity of California brandy, most of it from the vineyards and distilleries of Sonoma and Napa valleys. There are big bales of rags, gathered in every part of the State, which are being shipped to the Eastern paper and shoddy mills. Another big item in the Mexico's manifest will be leather, both for shoe and harness-making, tanned at Napa or the Mission, and which is said to be the very best in the world. Paints, oils and varnishes will be a big item in the Mexico's cargo, judging from the large number of barrels and cases of goods on the wharf, which is even now twice as much as was sent away on the St. Paul, and there is more to come. Borax is another big item, but the quantity of canned goods already on the wharf forms a pile by itself as large as all the rest of the goods put together. It includes peaches, pears, plums, apricots, apples, grapes, quinces and damsons from almost every county in California, but the bulk of it came from the canneries in the Napa, Sonoma and Santa Clara valleys, and is consigned to almost every city in the Eastern States.

Personal.

ALEXANDER H. RUTHERFORD, the mining man, who died in this city last week, left an estate of over \$100,000.

CHAS. H. MITCHELL has retired from the Grass Valley Union, and Messrs. Calkins and Tyrell are now editors and proprietors.

SOME of the Arizona papers are urging the removal of W. C. Barnes, chairman of Arizona's World's Fair Commissioners, because he is opposed to free silver coinage.

JOHN HAYS HAMMOND, the well-known mining engineer, and manager of the Bunker Hill and Sullivan mines of Idaho, left San Francisco on Thursday for a trip to Europe.

The Stewart Mining Bill Again.

TO THE EDITOR:—In your issue of February 11th you printed a copy of the above bill and stated that it had been introduced in the U. S. Senate on December 10, 1891, where it was read twice and referred to the Committee on Mines and Mining. You also stated that on Feb. 2, 1892, the bill was reported with amendments. There must have been stealthy work in bringing forward the measure or the mining public would have heard of it long ago. I think Senator Stewart might use his influence and surplus energies to better advantage for himself and the mining interests of the country than by perpetually tinkering at our present mining law. There has been no special call made by legitimate mining capitalists, by miners or prospectors, or indeed by any one else, for a change in its provisions. Though it is not by any means perfect, yet on the whole it is giving satisfaction to practical men, and the fear that under the manipulation of wily persons a change in its requirements might make it worse than it is has led those well informed on the subject to oppose any new bill, particularly if it failed to amend the most objectionable features in the existing statutes. Unfortunately for those who go out into the mountain wilds of our land to search for mineral treasure, which when successfully exploited benefits all classes, a vain man, greedy for public notice, who as a political freak, finds himself a senator in the halls of Congress, assumes that he alone in our large population is capable of preparing a satisfactory mining bill.

HUNGERING FOR NOTORIETY.

At first sight it looks as if Mr. Stewart, in bringing forward a mining bill every year or two, has only been trying to keep his name before the public, but further on I hope to show that, greedy as he is for notoriety, he has also planned a change in the law of 1872, which, if adopted, will rob many honest prospectors out of their hard-earned properties. In case it may be supposed that I am slandering the Sagebrush Senator in saying that his first and apparent aim is to make sure of an immense amount of free advertising, I will state a few facts: On March 10, 1888, you published a letter from me criticising his bill then before Congress. In 1889 he wrote me for further suggestions, but as he had failed to heed many important hints on that subject, which at his own request had been offered in your pages by intelligent correspondents, I refused to aid him because his conduct seemed to prove that his great ambition was to get his name blazoned in print as often as possible. To him notoriety and fame may be identical, and as long as printer's ink costs him nothing he wants plenty of it.

On December 4, 1889, he introduced his second mining bill, but as it was an exact copy of that of the previous year, the only progress made was in the advertising line. On March 29 and April 5, 1890, you printed a long article from me criticising the 1889 bill, and though I scarcely expected that any of my suggestions would be adopted, I will candidly admit that in his third bill, introduced on December 19, 1890, Senator Stewart did actually make very important improvements. This bill was finally reported by the House Committee on Mines and Mining—Mr. Thomas H. Carter, afterward Commissioner of the General Land Office, making the report. Several important amendments were suggested in that report, but as they did not harmonize with Mr. Stewart's special views, hopes and aims the bill they related to was allowed to die a natural death. To keep the advertising whirligig going, however, a new bill had to be framed and the patient, long-suffering Senate of the United States was for the fourth time made the stalking-horse for this law-giving mountebank of the Great American Desert to get himself once more before the public as the most profoundly erudite mining lawyer and law-maker of his age—he being the judge.

A CHANGE THE SENATOR DID NOT MAKE.

The following was a new section proposed in the Carter report in the Stewart bill, but as the magnate of the Comstock lower levels could not stultify himself by fighting against land-grant railroad companies, he would have none of it:

Aimed by adding the following as Section 7:

SEC. 7. That no patent or other evidence of title to any land shall be given under or in pursuance of any railroad land grant heretofore made by Congress to aid in the construction of any railroad or to any public improvement, in any of the States and Territories known to be producing precious metals, where such grant reserved from its operations mineral land, unless it shall be made to appear to the satisfaction of the Secretary of the Interior not only that the conditions of said grant have been complied with by the corporation seeking the patent or evidence of title, but that each and every legal subdivision of the land for which a patent is sought, within such States or Territories, is such land as was not excepted out of or reserved from the operations of such grant, and no person shall be accepted by the Secretary as a competent witness as to the mineral or non-mineral character of land claimed under such railroad grant unless such witness shall have practical knowledge of the mineral-producing region to which the land is situated and shall have personally examined the land concerning the character whereof he testifies. The Secretary of the Interior may make such rules and regulations as may be necessary to enforce compliance with the provisions of this section: *Provided*, That all witnesses shall be subject to cross-examination by any citizen qualified to locate a mine, and the evidence of any witness may be rebutted.

Though Senator Stewart adopted several of the amendments I proposed to his bill three years ago, he persistently retains in the present measure certain objectionable features, which, for reasons given then, were severely condemned. He is willing to yield some points, in the hope that his chief despoiling scheme may, by his concessions, be overlooked until it has, by statutory enactment, been fastened on our mining people. What is the stake, then, that as a mining attorney he has been playing for during the past five years?

HOW THE SENATOR EXPECTS TO "STRIKE IT RICH."

Until May 10, 1872, mining lawyers had a grand money-making time. Under the mining law of 1866 it was unnecessary to say, in the notice locating a lode, in what particular part of a district it was situated. If a peaceful man found a rich ledge, some hoodlum prospector had a location a mile away, which he was ready to swear was the

vein just found and the finder was trying to rob him out of his property. To swing or "float" his worthless claim so as to make its lines cover the coveted ground was an easy, though at times a rather dangerous feat. For half his thieving interest, the "jumper," or "floater," could get an unprincipled lawyer to start a suit against the real owner, and by means of perjured testimony, more than enough of which was always at command provided the claim to be seized was rich, the "hoodlum" gained the day.

Behind the visible operators there was sure to be a soulless capitalist, who furnished means for the contest, and later on stepped in to reap the harvest for which he had so liberally sowed. Mr. Stewart knows all about such matters, for, 30 years ago, he was in the very thickest of that species of fighting on the Comstock lode.

What have these facts to do with the Stewart mining bill? They bear exactly on the case. I charge Senator Stewart with a deliberate attempt to so change the present law that to "float" mining locations on to the legitimately owned property of other people will be quite as easy as it was under the 1866 law. His advertising scheme was to be of service as far as it could be made to work with advantage, but, under the cover of that, his real prize was to be ultimately won. He hoped that people would get so well used to his mining hills that vigilance would be relaxed, and he would gain his end without suspicion as to his aims being excited. He is really fighting the battle of disreputable mining lawyers. Fortunately all in that business are not rascals. There are plenty of honorable mining attorneys who would refuse to touch a "floating" location case, but there are others who, in their half-starved condition, would be glad to take anything that came to hand.

THE MAIN OUTCOME.

There are crooked mining operators who could afford to pay \$50,000 if the present mining law were altered so that it would admit of "floating" locations being made as in the days of yore. It is needless to say that our mining capitalists are honorable men, who would not go into any undertaking worse than highway robbery, but did not recent suits in the courts prove that there are persons operating on the Comstock lode, who, as to moral turpitude, stand on an equal footing with Turkish and Italian brigands?

I do not say that Senator Stewart expects to be paid for his efforts to rob the existing law of its grandest protective feature. But if, after I have said all that I mean to say on that subject, he still attempts to carry out his mutilating plan, he will deserve to be branded by the prospectors and miners of the United States as a traitor to their interests of the murkiest dye.

HOW RASCALLY CAPITALISTS WOULD BE REIMBURSED.

If "floating" locations were once more made possible, crooked operators would keep prospectors of their own stamp in every good mining district not thoroughly prospected. These prospectors would always have notices on record ready for service. If a new discovery of value were made, it would be claimed forthwith as being one of their recorded lodes. When asked to point out their monuments, they would boldly declare that the new discoverer had purposely knocked them down. By force of arms they would drive the lawful owner away, and, setting up their own monuments and removing all others, the transfer of a location originally made half a mile distant would be complete. If the real owner had taken friends over the ground at the outset to see that there were no monuments on it, their testimony would be overcome by extra witnesses on the other side. Where a lone discoverer depended entirely on his own testimony, he would be crushed at once. Have I not seen that low-down game played again and again under the law of 1866? By the law of 1872 Senator Stewart and other mining lawyers lost heavily. He might now have had several "floating" cases to argue in the United States Supreme Court, whereas he has not a single fee in that line.

CUTTING OUT NINE VITAL WORDS.

I take the following in regard to the identification of lodes from the law now in force:

"All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim, or claims, located by reference to some natural object or permanent monument as will identify the claim."

The language quoted is so ungrammatical that Mr. Stewart, in drawing his new hills, ought to have sought the aid of some school-teacher to put the paragraph into passable English for him; but probably he supposes that a United States Senator can afford to be illiterate, and that, though he is laughed at, his political prestige and glory will remain untarnished. But it is with the nine words printed in italics that I am now to deal. From every one of the Stewart bills these nine words have been excluded. They have not been absent by accident, for three years ago I directed attention in your pages to the fact that he was trying to get rid of them. If he succeeds in getting a law passed with these words stricken out, he and his kind of mining attorneys will be great gainers, and honest prospectors will be corresponding losers. I defy Mr. Stewart to offer a single mining reason for rejecting them. Any prospector of fair intelligence can so describe a lode he has discovered, relatively to a canyon, ridge, hill or spring near by, that it will be anchored securely to a spot. The law does not admit of the use of a natural object a mile or two away, for, the distance in that case being only guessed at, there can be no accurate identification of the ground by reference to it.

How is the position of a mining claim to be identified under the Stewart bill? Since natural objects are not made use of, any fanciful description an unprincipled locator might choose to give, relatively to changeable cow trails, to growing trees soon to be cut down, far-away creeks, buttes or towns, would serve his purpose for subsequent "floating" purposes.

HOW THE PRESENT LAW WORKS.

The following is a copy of a mining-location notice made use of in this district, only the names being changed:

"Having on the date hereof discovered the outcrop of a

mineral lode in place, situate and lying in the main fork of Webster canyon, about 200 feet above the cascade spring, the undersigned hereby locates and claims fifteen hundred linear feet thereon, under the name of the Rockford lode and mine. The claim extends 500 feet north, magnetic meridian, and 1000 feet south from the discovery monument, which stands on the croppings 60 feet south of the bed of the canyon. The locator claims 600 feet in width, and has placed the end-center and corner monuments of the lode on lines at right angles to its apparent course."

A lode located under such a notice as the above is a fixture. Where a canyon has no name, it must be named, and, once being known, any person can go to the discovery monument.

In view of the recent decision by ex-Secretary of the Interior Noble as to the importance of an actual discovery being announced in the location notice of a lode, the claimant of mineral ground must henceforward know just what he is doing, or he may find a cloud on his title. On Mr. Noble's decision, however, I hope ere long to have something to say in your pages.

A "FLOATING" LOCATION EXAMPLE.

If Senator Stewart succeeds in making piratical locations as effective in coming years as they were under the law of 1866, the following descriptive matter taken from a "jumper's" location notice, made use of in this camp on January 1st, will be the very thing he needs: "This claim is situated in the Dos Cabezas mountains, about 3½ miles northerly from the town of Dos Cabezas, and 1½ miles southeasterly from the Two Peaks."

Under the law of 1872, a lode claimed as above is void, from indefiniteness of description. The distances given are far from being accurate, but for moveable purposes they would meet the needs of the Stewart bill exactly. The "description" is such as would "identify the claim"—that is, it would prove that the claim existed on a given mountain slope. If opposing parties showed by actual measurements that the distances stated were thousands of feet wrong, the plea would be that the Stewart law did not require absolute accuracy. The "identity" of the claim would next be proved by any necessary amount of lying testimony, and the lode of some unsuspecting prospector half a mile away from the location, made for "floating" purposes, would be taken from him.

WHO WOULD BE HURT

If the nine words, now excluded from, were added to the Stewart bill? The honest prospector would not be hurt by their being present, but the half-starved mining lawyers of low moral fiber, for whom the Nevada Senator is legislating, would continue to suffer if his deep-laid plan of legalized rapine fell through. And fall through it must, or the prospectors and miners of the country will make Mr. William M. Stewart a very sick legislator. He will do well to halt at once.

THE LAW IN FORCE NEEDS TO BE CHANGED.

While the Stewart mining bill professes to amend defects in the law of 1872, it is a sham measure from beginning to end. Its author shows his ignorance of the practical working of the law he pretends to make better. The worst defect of the law now in force is in Sec. 2320. After stating that a claim may be fifteen hundred feet in length, it says "but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located."

The utter indefiniteness of the words quoted may be shown by asking a few questions: (1.) How far inside of the limits of the claim located must the discovery be? Will six inches inside be enough? Or must 60 feet be aimed at? Or will 600 feet be the regulation distance? Who knows? (2.) What kind of a vein or lode must be discovered to make the location valid? As practice goes, and has gone for 40 years, is not a solid bunch of ore as big as a man's hand, appearing on the surface, but fast at its roots to some other ore-body, a veritable "discovery"? If it is a discovery, what work does the law require the discoverer to do before the validity of his claim is assured? Who can tell? (3.) What relation must the discovered vein bear to the longitudinal line of the staked-out claim? The law itself is silent. There is the fiction of a lode running lengthwise of the location, but it is only fiction so far as the statute is concerned.

Many other questions might be asked in respect to the section indicated, but these are enough to prove how very crude and inadequate it is as the foundation on which a mining title is to be built. Yet in all of the Stewart mining bills there has not been a single attempt made to do away with the absurd incongruities of that part of the existing law.

CLOSING REMARKS.

The Stewart bill, if it becomes a law, will not check the relocating of mining claims. The change of the assessment year from January to October is good as far as it goes, but, as compared to other amendments required, it is only of third-rate importance. His town-site entry section would be good provided that a mine-owner, or several owners, were permitted to lay out a called-for town near their claims. Small mining towns or villages cannot be judiciously incorporated, and hence they will be excluded from the benefits of a really good measure. It will be noticed that I give Mr. Stewart credit wherever I think him entitled to it.

The drift miners ought to have a law suited to their needs, and the petroleum interest should not be overlooked. If our mining laws must be amended, let the proposed changes be laid before the mining community for consideration and emendation; but a man like Senator Stewart, who does not see the worst defects of the present enactment, is incapable of removing them. In December next the Senator is sure to give us another mining bill hash.

He will want free advertising again without limit. If I should have to "go for him" then, I will find some means of piercing his thick political hide that will make him wince.

JOHN DARE EMERSLEY.

Dos Cabezas, Cochise Co., Ariz., March 9, 1893.

California Wild Fruits, Nuts, Etc.

TO THE EDITOR:—Some of the wild fruits of California are very valuable, and well worthy of cultivation; but, strange to state, they have received very little attention by California horticulturists. This is occasioned, no doubt, by their being overshadowed by more profitable varieties of domestic fruits. It is to be hoped, in the near future, that some of the most superior varieties of wild fruits will be extensively tried. No doubt they can also be greatly improved by careful breeding and selection of the fittest. Some of California's shrubs and bushes are especially valuable for ornamental purposes, as well as for their yield of fruit. The following varieties, I think, are well worthy of notice:

The California wild gooseberry, red variety (*Ribes menziesii*), is certainly a desirable variety, and is said to be superior to crabapples for jellies, etc. The plant is exceedingly ornamental when loaded with its reddish-gold fruit. There is a yellow variety similar to the red one. *Ribes divaricatum*, a thornless gooseberry, is also a superior variety.

The California wild blackberry (*Rubus usinus*) flourishes in luxuriant profusion in the warmer portions of the State, especially among tules and on river-banks, etc. I do not think that they are as prolific as the common, cultivated varieties, but they are very valuable nevertheless.

Sierra black currant (*Ribes sanguinem*) is a shrub growing from 4 to 10 feet high, with pink and white blossoms, which are very attractive and fragrant. The fruit is black when ripe, covered with a faint, whitish bloom, and is very sweet, and may no doubt answer the purpose of any currant. It is extremely hardy, and adapts itself to many uncertain localities. There are a number of varieties of this Sierra black currant.

California thimbleberry (*Rubus nutkanus*) is a shrub growing from 3 to 6 feet high, has a large, white bloom, somewhat fragrant; fruit is a scarlet red when ripe, of fine flavor and taste, but would hardly pay to cultivate, I think.

California wild raspberry (*Rubus leucodermis*) grows in trailing vines, somewhat like the common dewberry. The berries are highly aromatic, with a decided tartish flavor. There are three varieties that I know of—the red, yellow and reddish-black. This latter has a fruit shaped like an acorn. These wild raspberries may be valuable to cultivate.

Sierra huckleberry (*Vaccinium ovatum*) is a low-growing, evergreen shrub, generally occupying wet, marshy places; fruit is green and reddish-black. I do not know whether it will ever pay to cultivate.

Oregon grape (*Berberis repens*) is a low-growing shrub of about a foot in height. Fruit is dark-blue. The roots of this plant are extremely valuable as a medicine for chills and fevers. The wood is also an orange-yellow, and, if I am correctly informed, capable of being highly polished.

Elderberry (*Sambucus glauca*) is a rapid-growing bush, from 4 to 15 to 20 feet high; blossoms are white; the fruit is reddish-black when ripe, covered with a faint, powdery bloom, and is very valuable for jams, jellies, wines, etc.

Wild grape (*Vitis Californica*), a very hardy grape, and adapting itself to a great variety of soils and climates; the grapes are small in size, with a high, musky flavor; bunches small and compact.

River grape is a variety of large size, with a musky, agreeable flavor; bunches are large and straggling; they would no doubt pay to cultivate.

Wild cherry (*Prunus demissa*) grows 2 to 12 feet high; fruit is black; may be of value for medical purposes. There are three other varieties in California. The Alpine cherry is a native of a high elevation, has small, willowy leaves, and the bark somewhat resembles the common cherry tree. The trees sometimes attain five and six inches in diameter and from 10 to 25 feet in height. The cherries of the Alpine variety are very highly colored, intensely bitter and unfit to eat; the trees are immense bearers.

Unnamed variety, that resembles the *cascara sagrada* in bark and foliage, is a native of the upper ranges; cherries are dark-black, of fair size, and a strange aromatic flavor; may be of great value for several purposes; cherries ripen in October. I have seen trees of this variety fairly breaking with their immense loads of glossy, black fruit. This cherry, I think, is closely related to *Prunus Besseyi*, the dwarf Rocky mountain cherry, which is much prized for its immense yield of superior fruit.

Evergreen cherry (*Prunus ilicifolia*) grows from 8 to 12 feet high; the fruit is red or dark purple and of a large size.

Wild strawberries.—All the wild strawberries of California belong to the Alpine variety, and, therefore, are mostly everbearing. There is a great number of varieties, some of which will pay well to cultivate. As I have made quite a study of the California wild strawberries, I know whereof I speak. I think they would be an excellent stock for crossing with larger varieties of common strawberries. For sweetness and fine flavor, these California strawberries are unrivaled, and these desirable traits or qualities, I think, could be perpetuated. California Alpine strawberries are extremely hardy, growing in many different soils and altitudes. The following is a list of a few that I have tested the last season. I have a great many more varieties, but cannot report definitely until next season.

Chilensis (*Fragaria Chilensis*) is said to be identical to the Chilean species of wild strawberries. The leaves of this variety are very large, blossom yellowish white and perfect; fruit small, but of excellent flavor, reddish white in color, everbearing; its value not yet proved.

California Alpine (*Fragaria Californica*) has very small leaves. I have not succeeded in making it bloom yet and therefore cannot speak of its fruit.

Red and Gold Alpine—Remarkable for the symmetry and shape of its leaves. The runners and stems of this variety are red, which makes it sort of an ornamental plant; productiveness and value not yet proved. I obtained the plants too late to give any definite idea of their value.

Honey Strawberry (*Red Alpine*) is identical to a Swiss variety; is of great value to cultivate; berries small to medium size, of an exquisite flavor, and a glowing red in

color; immensely productive, blossom perfect, a very hardy strawberry.

Mill City Alpine I think will also be of great value to cultivate; berries small to medium size, beautifully colored, and the finest flavored of any strawberry that I know of. The fruit stalks of this variety resemble the Honey strawberry, except the fruit is round in shape.

California Green Alpine is a medium-sized berry, of fine color and flavor; its value not yet proved.

I have taken up wild strawberry plants from a great many patches in the upper Sierras and next season I may bring to light several other choice varieties.

Wild Plums.—How many varieties there are it is hard to state. I had hoped this year to learn more of this valuable fruit, but being an off year in the fruiting line I learned nothing. There are varieties that I am certain it will pay to cultivate. A fruit-grower in Northern California states that in early times he bought a variety of wild plum from the Indians that was superior to the well-known French prune. This plum is no doubt one of the yellow varieties, which are said to be very sweet and edible and which inhabit the granite formations of the middle regions of the Sierras. The *Prunus subcordata*, or common red wild plum of the Sierras, grows from 4 to 12 feet high. The fruit is small, highly colored and somewhat bitterish in taste.

Sierra Hazel (*Corylus*) is a bush growing from 8 to 20 feet high; the nuts are greatly prized by all persons. Sierra hazel nuts are larger than the Eastern variety.

Sierra Nutmeg (*Torreya*).—Of great beauty as an ornamental tree. The foliage is silvery, bluish green; it yields a nut said to be similar to the nutmeg of commerce. The heart wood of this tree is golden yellow and is capable of being highly polished; the wood is also possessed of a spicy, nameless fragrance and is also very durable. Trees of this variety sometimes attain a height of 50 or 60 feet, and 18 inches in diameter.

Sierra Yew tree (*Taxus*) is an exquisitely beautiful tree; the foliage is dark green; it yields a small, reddish, bell-shaped fruit, very delicious to eat; the fruit ripens from September to November. The wood of the Yew tree is very hard and of great value for many purposes.

Sierra Strawberry tree (probably belongs to or is related to the *Euonymus*) is a tree of surpassing and wondrous beauty. In the fall the leaves all drop off and the tree is fairly breaking with large-sized, glowing, red berries—so red that they almost sparkle in the light. The bark is mottled and of a beautiful chocolate color. It is by far the most beautiful of all trees in the Sierras, or possibly in the world. This wonderful tree is seldom met with in the Sierras. I only know of three or four trees, and they are in very isolated localities and growing at a very high elevation.

Chinquapin, a dwarf chestnut, is generally found inhabiting the higher ranges; the nuts are small and inferior, but no doubt can be greatly improved by cultivation. Botanical name of Chinquapin, (*Castanopsis Chrysophylla*).

California Holly or Toyon (*Heteromeles arbutifolia*) is a valuable ornamental bush; leaves are a light, shining green; the blossoms are small and whitish green in color, and are much liked by honey bees on account of their large secretion of nectar. In the fall of the year the holly is loaded with bright red berries, which are much prized for decorative purposes.

Madroña (*Arbutus menziesii*) is a rapid-growing, beautiful tree, of reddish chocolate-colored bark, and extremely pretty, dark green leaves; the tree is an evergreen; in the fall large trees are covered with bunches of glowing red berries, which forms quite a contrast to the dark green leaves. The blossoms of this tree are also much liked by bees.

Sugar Pine (*Pinus Lambertini*) is without doubt the most valuable lumber tree in the world. It is a soft, easy lumber to work, durable and non-checking; it yields a sugar, valuable for its laxative qualities, and also furnishes a very good, edible nut. The sugar pine most frequently inhabits the lofty ridge-top of the upper Sierras. It is easily recognized from its neighbors by its heavy, sturdy limbs and its long yellow cones, which depend gracefully from the ends of the limbs.

Nut Pine (*Pinus Sabiniana*) also yields a desirable nut. This tree generally inhabits the foot-hill regions and is recognized by its silvery-gray foliage and its loose, tropical appearance. S. L. WATKINS.

Grizzly Flats, March 8, 1893.

Ancient Water Conduits.

In the reign of the Roman Emperor Nero, Rome was supplied by no fewer than nine large conduits, having an aggregate length of 255 miles, which delivered over 173,000,000 gallons daily. Afterwards the supply was increased to 312,500,000 gallons daily, equal to the rate of 325 gallons to each inhabitant. The Aqua Marcia conduit, which alone supplied the drinking water, was 16 feet in diameter and 40 miles long. One of the principal aqueducts it crossed is remarkable for the grandeur of its dimensions and for the skillfulness of its construction. It had to sustain three large conduits, the Julia, Sepula and the Aqua Marcia, and the greatest precaution was exercised to prevent the first two thus draining into the lower one, and from deteriorating its waters. Strabo, in alluding to the skill of the Romans in the application of hydraulics, remarks that not only were there subterranean conduits at Rome, but that all the houses had siphons or water pipes, which probably could be used to extinguish accidental fires.

They drained the Pontine marshes, and so improved the river system that, according to their historians, there was no river in Italy that was not made useful for the purpose of commerce and the transport of troops and provisions. Not content with thus developing the resources of their own country, they studied, wherever victory led the way, to improve the condition of the vanquished by similar public works. They constructed a series of large reservoirs along the range of the hills nearly bordering on the Black Sea, from which they supplied large covered cisterns in

Constantinople with a pure and constant stream of water. In France they constructed conduits to supply Lyons, Fiejus, Sony, Metz and Nismes. The first, owing to the boldness of conception, and the skillfulness of its construction, because it is one of the first known instances of the use of metal pipes subjected to any great pressure, is worthy of more than passing notice. It was designed especially for the purpose of supplying the palace of Claudius, situated in the highest part of the town.

The Nismes conduit, constructed in the time of Augustus, B. C. 19, which delivered 14,000,000 gallons daily, is celebrated for a magnificent aqueduct called the Pont du Garn. Humble describes it as one of the grandest monuments the Romans have in France or any other country.

Again, in Spain and Portugal they supplied the towns of Segovia, Seville, Evora and Lisbon by means of conduits of considerable length, which crossed deep valleys on aqueducts of great magnitude, which, however, present no very remarkable features worthy of further comment.—Fire and Water.

Neglect of the Mining Industry in California.

SAN FRANCISCO, March 14, 1893.

TO THE EDITOR:—After an absence of a few years, I return here to find a most surprising condition of things, so far as relates to what was, when I left, the most engrossing and prominent interest of the State. It is unnecessary to say I allude to mining. I do not remember hearing the subject mentioned for several months after my return, and so far as the discussion of the subject goes, I have heard so little that I can hardly realize that I am living in a community whose interests are so identified with this important industry. I hear plenty of talk about hard times and dull business, but as I say, I hear no earnest talk about the development of the enterprise of mining, which has hitherto been the prosperity and wealth of the State, while as we know, there are yet as good opportunities for profitable mining as ever before. It would seem, however, that everybody wants some other fellow to take all the risk and do the work. This apathy and indifference to the development of such an important industry is one of the causes and result of the so-called hard times, although judging from the magnificent buildings going up on all sides, there must be plenty of money somewhere, it is certain that the whole community is not dead-broke.

Mining is one of, if not the most important industries of this State, and yet it seems to be ignored, while there are, as is well-known, millions of dollars in the ground and rocks, awaiting the miner who is idle for want of the capital to set him to work.

The answer to all applications for this capital is, "oh, mining is so uncertain and risky." Suppose such a sentiment had prevailed in the past, would this city have been what it is to-day? The miner's pick has built these magnificent blocks of buildings and palatial residences, not agriculture. If we had to depend on that industry alone, the wealth and population of this city would have made a very poor showing by comparison. As to the risks of mining, what business has not its risks and liabilities to failure? How many enterprises in so-called legitimate business are successful? We know from experience and statistics, that the percentage of success in mining is fully equal to that of any other kind of business where the same amount of capital is invested, almost any kind, to be successful requires practical experience. It is the same in mining. It is a trade or calling to which an abundance of men have served an apprenticeship and are skillful, so there is no excuse on that head.

While the people of this State are so apathetic and indifferent to the wealth within its borders, those of our surrounding States and territories are wide-awake to the profits and advantages of mining, Montana, Colorado, Idaho, Arizona, are pushing mining enterprises, and capital is flowing in, new towns are springing up, new camps are established, population is increasing, while ours is decreasing. The whole interest of the community seems to be centered on the question of establishing of a new line of steamers, or moving the Capitol. The idea seems to be that with cheaper freights prosperity will follow. It may make goods cheaper but will that fact remedy the evil? Will it give employment to the vast number of idle men who are begging for work?

The true remedy for the dull times complained of, is, to open and work our mines. The savings banks are overloaded with money, capitalists have thousands of dollars lying idle, seeking investment, but not a dollar for mining; and yet we wonder that capitalists of the east do not invest in our mines. We certainly do not set them an example of confidence in the enterprise, and they say, why do you ask us to buy your mines and put in our money, when you do not invest your own?

We have but ourselves to blame for dull times. The fact is, we are fast losing our boasted enterprise. We are losing our energy, and early day "push," getting to be dull and hum-drum. The capitalist won't invest again the money he made out of the mines, and those who would, have none to invest. While we are droning along and grumbling at the dullness of business our enterprising neighbors are pushing their mines, building railroads and cutting off our trade north and south. We have gone to sleep; some day we will awake Rip Van Winkle like, and discover that we have sunk into insignificance, while we have within our borders every element of wealth and prosperity, and prominently so our mines, containing millions which we are too lazy and indifferent to take out, while we grumble and whine over the decay of prosperity.

OLD CALIFORNIAN.

Freak of an Artesian Well.

Messrs. Bennett & Taylor recently drilled a well for Mr. Wm. Duncan, on his sister's (Mrs. T. S. Brown's) place back of the Oak Glen Cottage property, says the *Nordhoff Ojai*. The well was put down 388 feet, and while an abundance of good water was found, there was no flow, which

fact puzzled Mr. Ezra Taylor, who has charge of the drilling business, as he felt pretty sure of striking a flow there. The well was put down farther than any around here, because he hoped each hour to make a "strike." But the effort was abandoned when the pipe was down 388 feet and a pump put in.

During the last storm the well was transformed into a gusher, and ever since has been sending an inch and a half stream up through the pump valve. Mr. Taylor will remove the pump and thinks that then the flow will be materially increased. Now every one is at liberty to guess whether or not the flow will be permanent; but it would be intensely interesting to be able to look at the cave of earth that probably took place at the end of the pipe, thus making a vent for the big underground stream that is rushing across the Ojai Valley.

"Machine" Mining in Wyoming.

The Cambria coal mines are located in the State of Wyoming, on the Burlington & Missouri River R. R., and at the southwestern border of the celebrated Black Hills. They are situated beneath a broad plateau, about 5500 feet above the sea, the vein averaging seven feet thick of fine bituminous coal. While this vein contains some impurities, those can be easily removed in the mining, leaving a steam and coking coal unequalled on this side of the Atlantic. These mines are what are known as "drift mines," being entered from the side hill. They are two in number—Antelope and Jumbo—the former being on the west side of the canyon, with an elevation of 40 feet above the railroad tracks, the latter being on the east side at an elevation of 70 feet. The coal from both mines is delivered at a common tippie in the middle of the canyon. The coal is brought out by the tail-rope system of haulage. The chute, where the railway cars are loaded, contains the finest of machinery for crushing, screening, elevating and conveying the different grades of coal to any desired point of delivery, the customer being thus enabled to procure, at pleasure, any size or grade of coal desired. The method is thus described by a correspondent of the *Coal Trade Journal*:

"The mining is done exclusively by machinery, the power used being compressed air, which is conveyed into the workings by means of pipes and air-receivers, supplied from the power-house located on the outside. The Jeffrey mining machines are used in connection with the Jeffrey giant air-power coal drill. There are three compressors, kept running night and day, year in and year out, which were built by the Norwalk Iron Works Co. An electric plant furnishes light for the mines, as well as for the buildings connected with the mines. Eleven steam boilers, with a capacity of 800-horse power, and which will shortly be increased to 1200, drive the machinery. A finely equipped blacksmith and machine-shop keeps up all needed repairs.

"Having had charge of the Cambria mines for a year past, and being well acquainted with all the large machine mines in the United States—in fact, having had charge of the development of many of them and having visited most of the others—I have no hesitation in saying that the mines at this place are the most extensive in the United States where the entire output is the result of machine-mining. Although these mines have been opened only about three years, they already have a capacity of from 1600 to 1800 tons daily, which capacity will surely be doubled before the end of 1893. The mines are distant several hundred miles from any other coal fields, and the Cambria proprietors are practically without competition. Had it not been for the existence of this coal, the railroad before named would not have been built, owing to the want of proper fuel with which to operate it.

"As the principal part of the mining is done by machinery, unskilled workmen have here a rare opportunity for remunerative employment. More than this, there naturally cannot be, under a system of mining like this, that great variance in the wages of the different employes which is naturally so productive of discontent and consequent strikes. The company has a plant of coke ovens, by which a good article of coke is made from the fine slack taken from the coal by the screens. The slack, which enters into this coke, requires no treatment other than screening to fit it for use, though experts say that the product could be improved by a system of washing.

"As I have before remarked, these mines are at the southwestern border of the Black Hills—a fact of great moment when one comes to estimate the value of the plant. It is my opinion that 1,000,000 tons of coal can be taken from this field annually for 75 or 80 years without exhausting the supply of coal.

"Since the commencement of this enterprise, every move has been toward the betterment of the condition of the workmen. Thus, two fine hotels, with 360-person capacity, and also 100 neat dwellings, have been erected for their use. In addition, the proprietors have been to the expense of putting up a schoolhouse, church, hospital and other buildings for the laborers' convenience and comfort. Added to all this, there are fine offices and extensive stores, so that this is a veritable city, filled with fully 400 of the best paid, most prosperous and truly contented workmen to be found on the face of the earth."

Hydraulic Mining Pump.

The London *Colliery Guardian* thus describes Joseph Moore's patent hydraulic pumping arrangement: "Two columns of water are substituted for the ordinary pump-ropes connecting the steam engine with the pump, which may be placed any distance from each other. Advantage is taken of the fact of water being practically incompressible, and that if a pipe is filled with water a piston at one end will, if pushed forward, propel a piston placed at the other end in the same direction. With two pipes and four pistons a reciprocating motion is obtained. The arrangement consists of a hydraulic cylinder in which works a piston or ram, called the power ram, which is moved by a crank driven by a steam engine. At the pump there a cyl-

inder exactly the same as that at the engine, in which is a piston or ram attached to the plunger of a double-acting pump. A pipe connects the end of the power cylinder at the engine with the end of the motor cylinder at the pump. When both cylinders and pipes are filled with water and the water piston is moved by the engine, the water in the power cylinder is forced through the pipe into the end of the motor cylinder at the pump, and the motor piston is moved. In a like manner when the power ram at the engine moves, that at the pump responds, carrying the pump plunger with it. In this way the pump plunger is moved backward and forward in the same way as if there had been a direct connection by means of rods between the steam engine and the pump. Arrangements are made to provide for leakages, every adjustment is automatic, and in practice they are found to work satisfactorily. A complete plant has been erected at the Linlithgow Oil Co.'s Champfleurie mines. The pump lifts 93 fathoms vertically, is double-acting, 12 inches in diameter, with four feet stroke, and discharges 300 gallons per minute. The pressure of the water in the lower pipes is about 2000 pounds per square inch. At Balquhastone colliery, Slamannan, there are two sets of double-acting 12-inch pumps, worked by one geared engine, raising 600 gallons a minute from the bottom of a shaft 65 fathoms deep. The driving cranks for the surface power rams are fixed at right angles, so that the engine is balanced. This arrangement is found to work very well, and several plants have been fitted up on this plan. The system of pumping described by the writer has been applied for sinking purposes, a pump having been used for raising 300 to 500 gallons per minute during the sinking of a shaft 100 fathoms deep. The steam engines employed for working these pumps may be either direct-acting or geared, as may be found most convenient. Usually the engines are geared and in the proportion of six to one; a pump worked on this system gave a useful effect of 68 per cent, with a distance of 800 yards between the engine and the pump; another pump gave 66 per cent of efficiency."

A Boundary Line Survey.

It has been ascertained that in the boundary survey between Alaska and British Columbia several parties will be placed on the mainland bordering the archipelago Alexander. Some of the parties are Canadians and several are detailed by Superintendent Mendenhall of the United States Coast and Geodetic Survey. This part of the boundary line is by treaty within 30 miles or less of the continental shore, as Vancouver expressed it. There will be triangulation and astronomical parties on the rivers Taku, Stickeen and Unuk, and one in Holkham bay, and one, an astronomical party, at Sitka. The chiefs of the Canadian parties are not known. Those of the United States are Messrs. Ogden, Tittmann, Dickens, McGrath, Turner and Morse. The last named will be stationed at Sitka.

Each Canadian party will have a United States assistant attached to it, and each United States party will have a Canadian officer attached to it. This is the usual arrangement in such international investigations.

The men for the coast survey parties will be taken from Puget Sound and San Francisco. The work will be very rough and progress cannot be very rapid. The rivers are either masked by glaciers or have great glaciers projecting into them from the sides of the gorges. The mountains rise from 3000 to 5000 feet above the sea level, and the seaboard flanks are covered with dense forests and undergrowth to about the 2500-foot elevation. The coast line must be very irregular, and along that the boundary line runs when within 30 miles of the shore.

The coast survey steamer *Hassler*, Captain Harber, will be engaged during the working season in connecting the astronomical stations of the foregoing parties with Sitka for distance of longitude by chronometers. This standard station was determined by Professor Davidson in 1867, and observations have been made through many seasons since, so that the longitude is well determined.

THE old sectional docks at Mare Island Navy Yard were sold this week for \$5,031. The purchasers have twenty days in which to remove the docks, and they cannot say whether they will break them up or take them to Oakland to be used for docking vessels there until the exact condition of the docks is ascertained. It is said there are 120 tons of iron in sight about the docks, not to mention the great anchors and chains that hold them in place. The sectional docks were the first of the kind built on the Pacific Coast and were begun in 1852. They were composed of eleven sections, each 130 feet high and 33 feet wide. The extreme length of the structure was 325 feet, and it was capable of accommodating a vessel of 3,000 tone burden. When the stone dry-dock at the Navy Yard was finished, the sectional docks were abandoned.

THE new wharf of the Southern Pacific Company at Santa Monica will be 4600 feet long, and 3100 feet have been completed. For 1500 feet of the length there will be 34 feet of water at low tide. The outer portion will be 131 feet wide and will hold 7 tracks. A coal bunker to hold 8200 tons is to be built. In the construction of the wharf creosoted piles and Oregon pine lumber are being used, and when it is ready for use the company will practically abandon its terminal at San Pedro, which it has used for a number of years past and which has been the port for all of the sea shipments of Los Angeles and its immediate vicinity. All lighterage will be done away with by the change.

THE *Ferguson Lode* will hereafter be published at Pioche, Nev. The entire bottom having apparently fallen out of the Monkey Wrench country for the present, makes a change of base necessary.

THE *Amador Record* has closed its first volume. This is one of the mountain papers that keeps track of local mining news so that people outside of the county can know what is going on.

The New Game Law.

The amended Emeric game law has passed and is now the law. The following are its provisions:

SECTION 1. Section 626 of the Penal Code of the State of California is hereby amended to read as follows: Every person who, in the State of California, between the 1st day of March and the 1st day of September in each year shall hunt, pursue, take, kill or destroy, or have in his possession, dead or alive, except for purposes of propagation, any quail, bob-white, partridge or grouse, or any kind of wild duck, snipe or rail, shall be guilty of a misdemeanor.

Every person who, in the State of California, shall take, gather or destroy the eggs of any quail, bob-white, partridge, pheasant, grouse or dove, or any kind of wild duck, shall be guilty of a misdemeanor.

Every person who, in the State of California, between the 1st day of March and the 1st day of August, in each year, shall hunt, pursue, take, kill or destroy, or have in his possession doves, shall be guilty of a misdemeanor.

Every person who, in the State of California shall, within the two years next (except from September 1st to October 15th in each year) after the passage of this Act, hunt, pursue, take, kill or destroy any male deer, elk, antelope, mountain sheep or buck, shall be guilty of a misdemeanor.

Every person who, in the State of California, shall at any time hunt, pursue, kill, take or destroy any female deer, antelope, elk, mountain sheep or doe shall be guilty of a misdemeanor.

Every person who shall at any time hunt, pursue, take, kill or destroy any spotted fawn shall be guilty of a misdemeanor.

Every person who shall take, kill or destroy at any time any bird mentioned in this Section, unless the carcass of such bird is used or preserved by the person so taking or slaying it, or is sold for food, shall be guilty of a misdemeanor.

Every person in the State of California who shall at any time sell, or offer for sale, the hide or meat of any deer, elk, antelope or mountain sheep, shall be guilty of a misdemeanor.

Every person who shall buy, sell, offer, or expose for sale, transport or carry, or have in his possession any deer or deer-skin, or any deer hide or pelt from which the evidence of sex has been removed, or any of the aforesaid game at a time when it is unlawful to kill the same, shall be guilty of a misdemeanor.

Every person who, in the State of California, shall, within the two years next after the passage of this Act, hunt, pursue, take, kill or destroy or have in his possession, except for purposes of propagation, any pheasant, shall be guilty of a misdemeanor.

Every person who shall, at any time, net or pound any quail, partridge or grouse, and every person who shall sell, transport, or give away, or offer or expose for sale, or have in his possession any quail, partridge or grouse that has been snared, captured or taken in or by any means of any net or pound, is guilty of a misdemeanor.

Proof of possession of any quail, partridge or grouse, which shall not show evidence of having been taken by means other than a net or pound, shall be "prima facie" evidence in any prosecution for violation of the provisions of this Section, that the person in whose possession such quail, partridge or grouse is found took, killed or destroyed the same by means of a net or pound.

Every cold-storage company, person keeping a cold-storage warehouse, tavern or hotel-keeper, restaurant or eating-house keeper, marketman or other person who shall sell, expose or offer for sale, or give away, or have in his possession in this State any deer, quail, bob-white, partridge, pheasant, grouse, dove or wild duck during the time it shall be unlawful to kill such animal or bird shall be guilty of a misdemeanor.

Every person who shall use a shotgun of a larger caliber than that commonly known and designated as No. 10 gauge, for the purpose of killing or destroying any wild duck, rail, quail, partridge, pheasant or grouse, shall be guilty of a misdemeanor.

Every person who, upon any inclosed cultivated grounds which are private property, and where signs are displayed forbidding such shooting, shall shoot any quail, bob-white, pheasant, partridge, grouse, dove or wild duck, without permission first obtained from the owner or person in possession of such grounds, shall be guilty of a misdemeanor.

Any person found guilty of a violation of any of the provisions of this Section, shall be fined in a sum not less than \$20, or be imprisoned in the county jail in the county in which the conviction shall be had not less than ten days, or be punished by both such fine and imprisonment. One-half of all moneys collected for fines for violations of this section shall be paid to the informer, one-quarter to the district attorney of the county, and one-quarter shall be paid into the Fish Commission fund for the purchase and distribution of game birds in the various counties of the State.

SEC. 2. All Acts and parts of Acts in conflict with this Act are hereby repealed.

SEC. 3. This Act shall take effect and be in force from and after its passage.

THE proposition to build an electric road between Kern City and Bakersfield is assuming definite proportions, and the scheme will be developed and the road constructed within the next five months, if at all. Samuel H. Taylor, representing the Westinghouse Electric and Manufacturing Company, has been engaged with the projectors of the enterprise, in looking over the proposed route, on which he has given an estimate of the cost of construction and other important details. The Westinghouse system will be utilized. The power plant will be located at the East Side Canal drop, which has a capacity of 100-horse power. The road will be two and a half miles long.

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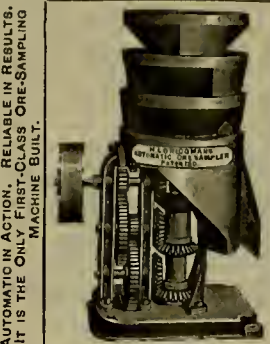
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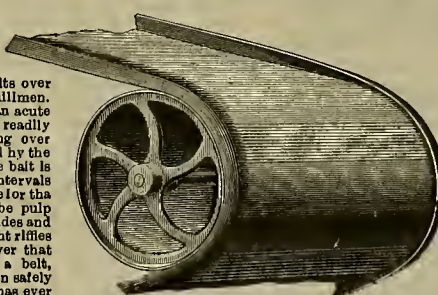
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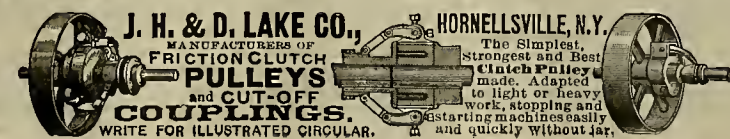
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Mechanical Progress.

Manufacturing Specialties.

A manufacturer of a line of standard goods, says *Iron Age*, had been complaining of the total lack of profits in his business to a sympathizing friend, when the latter was struck by a brilliant thought and asked: "Why don't you take up a specialty and drop staple articles that everybody is making?" The unexpected reply was: "There is too much competition in specialties themselves." We venture to say that this idea is as new to a majority of our readers as it was to the man who asked the question. But, with comparatively few exceptions, it is too true. The mechanical genius who can at this time devise some novelty which does not come in direct competition with something else capable of doing the same thing or answering the same purpose is a genius indeed. Take small wares, for instance, such as are used in the kitchen. The ingenuity of inventors has been racked to get up numberless devices for beating eggs, for sifting flour for grinding coffee, etc. Appeals are mutely made by every form of apparatus to the housewife's neatness, celerity, mechanical taste or curiosity, but there are so many articles of such totally different kinds warranted to do the same thing precisely in the most satisfactory way that she is bewildered and is as likely to select the least efficient as the best. The same remarks would apply to mechanics' tools, to personal furnishings, to wagon and carriage supplies, to so-called railway specialties, etc. There was a time when labor-saving automatic machinery began to take the place of toilsome hand labor, when a man of acute perception and mechanical knowledge could easily see an opportunity for the invention of a device which would save labor, economize time, cheapen production and perhaps improve the quality and appearance of an article in quite common use, and the practical development of the thought brought him into prominence as a manufacturer of specialties, and perhaps in time made him wealthy, but to-day such opportunities are few. The ground has been pretty thoroughly covered.

Mechanical talent at this time seems to be turning in a totally different direction. The capabilities of machinery having been very thoroughly developed and opportunities for new applications being discouragingly rare, the most notable achievements making seems to be in the direction of cheapening the production of staple articles. This is the keynote of the manufacturers who are now most successful. The search for specialties is not alluring, as specialty competes with specialty, and consumption is perforce limited. In staple articles, however, there is a constant trade. The manufacturer, therefore, who surpasses his fellows in the cheapness with which he can turn out staple articles of equal quality surpasses them also in securing a large share of the trade and better profits. Never before has mechanical genius so applied itself in this country as now to the solution of the question: How shall the cost of production be further decreased by the introduction of more efficient machinery?

New Method of Rolling Old Steel Rails.

In utilizing old steel rails it has generally been customary to split apart the head, neck and base, beat each part separately, and roll the pieces out into small plates. Several western mills have lately adopted a new method of rolling, known as the McCloud process, by which no splitting is necessary. The rails are carefully selected. Only those weighing 56 pounds and upward per yard being used, and cut into pieces from three to six feet long. The pieces are then beaten and passed six times through a set of rolls. On the first pass the base of the rail is bent over to the side, on the next pass it is bent more and the head is somewhat corrugated, on the third pass the rail begins to look somewhat like a plate, and the other passes complete the process. The rolls are so designed that the metal is gradually flattened out without being bent over on itself, which would be highly injurious, since the steel does not weld. The finished plates are about one-quarter of an inch thick, and from eight to ten inches wide, depending on the section of the rail from which they are made. They have been used for a variety of purposes, especially for making wire nails, for which they seem especially suited. The inventor of the process, Sydney McCloud, has also invented another system of rolls for wrapping narrow plates into a bar, which is much stronger than a solid piece of the same size. The reason of this additional strength is to be found in the fact that if the outside layer of metal is broken the inner

layers are intact, and will resist further strain, while in the case of a piece of solid steel the rupture of the skin is fatal. The seams in these wrapped bars are said to be scarcely perceptible to the naked eye, and only appear when the metal is bent over and twisted off, which requires a great amount of force. The advantage of using these wrapped bars under certain conditions will be better understood when it is recalled that steel frequently bears a stronger resemblance to a refined, ductile cast iron than to a fibrous wrought iron, and partakes so largely of the character of cast iron that a small scratch on its surface may cause serious trouble if the piece is solid and exposed to vibratory strains.—American Manufacturer.

A New Mitrailleuse for Cavalry.

A form of mitrailleuse which, owing to its lightness, is said to be peculiarly well adapted for service involving rapid movement has been devised recently by a French artillery officer, and having been submitted to the Minister of War is now being subjected to experimental tests. This arm is intended primarily for the use of Cavalry or for employment in mountainous districts where the transportation of heavier pieces of artillery might be difficult. The inventor claims that his weapon will not impede the movements of cavalry, as each mitrailleuse complete with 2000 rounds of ammunition can be easily carried by one horse.

As a mountain gun the piece can be carried by one man on a framework of wood or metal forming a sort of hod, which is so constructed as to serve as a mount for the gun in action. It is asserted that one artilleryman or properly trained cavalry or infantry soldier can mount the gun ready for use almost instantly and that its service requires but one man.

The new mitrailleuse can fire 600 small-caliber projectiles per minute, equaling the performance of 25 or 30 men, and this can be maintained for a considerable time. Officers who have witnessed the trials executed by direction of the French authorities express the opinion that the use of the new weapon would be extremely advantageous in cases where a cavalry force was suddenly required to hold or attack a position against infantry. Should further tests continue to prove satisfactory the issue of some of these guns to certain cavalry corps is said to be contemplated, in order that they may be subjected to trial under ordinary service conditions.

Lining Mine Shafts.

A new method of lining and curbing shafts and wells has just been brought under our notice, in which blocks of moulded concrete are employed, which form segments of a circle or an oval, varying in size according to the dimensions of the shaft or well, and weighing from 8 to 12 cwt. each. These blocks have at each side a round fluting, with a channel at the top, and a corresponding but smaller semi-cylindrical roll or heading at the bottom; they have also two drill holes, one running vertically and centrally and the other horizontally from back to front at the base. The vertical drill-hole enables a rod with a hook or ring to pass down and be intersected by a bolt running through the horizontal drill-hole, thus holding the rod and supplying the means of hoisting or lowering the blocks into their places. When a complete round of segments is formed (the rocks break joint like ordinary brickwork), the vertical flutings are rammed with a cementing material, and the space between the round and the natural wall of the shaft is packed with concrete. Before laying the next round of blocks, a thin layer of cement is placed in the channel on the top of the blocks beneath, into which the projection of the upper blocks fits, the joints thus becoming perfectly tight and forming a solid lining through which water cannot penetrate. In Germany, it is stated, this system has already proved a success, several colliery shafts in the Saarbrücken district, belonging to the Prussian Government, having been provided with linings in the manner described, with satisfactory results.

HEIGHT OF BUILDINGS.—A revised building ordinance is now before the City Council of Chicago, Ill., says the *Engineering News*, fixing the maximum height of buildings at 160 feet above the sidewalk level. It favors piles for foundations, but does not forbid the use of steel or iron rails. All buildings devoted to the sale, storage or manufacture of merchandise, and all stables which are 100 feet or more high, must be entirely of fireproof construction. Buildings of less than 100 feet and more than 60 feet high must be of slow-burning or mill construction; buildings of less than 60 feet in

height may be of ordinary construction. In Class 2, buildings used as residences for three or more families, hotels, boarding or lodging houses, etc., occupied by 25 or more persons; and all office buildings which are 90 feet or more high, must be entirely of fireproof construction. If less than 90 feet and more than 60 feet, their construction must be slow-burning or mill construction. If they are less than 60 feet in height their construction may be of the ordinary sort. Class 3, all buildings used as residences for one or two families, or for less than 25 persons, may be built of ordinary construction, except if they are 60 feet or more high, they must conform to the limitations fixed for buildings of Class 2. In Class 4, all buildings used as assembly halls for large gatherings, whether for purposes of worship, instruction, or entertainment, must be safely constructed under rigid rules. Height of buildings of non-fireproof construction is estimated from the sidewalk level to the highest point of the roof. It is probable the ordinance will be further revised before finally becoming a law. Such changes as are made will probably be in minor details or verbiage, as the main points have already been fully covered.

Scientific Progress.

Delicacy of a Certain Chemical Test.

One of the most delicate tests known to chemical science is that in which potassium sulpho-cyanide is employed to discover the presence or absence of the element iron in a given solution. Potassium ferro-cyanide is, perhaps, used more frequently, but gives much less satisfactory results. In cases where this salt failed to indicate the slightest trace, the sulpho-cyanide yielded a very evident proof of the presence of the element in question. The observance of this fact led to an attempt to ascertain as nearly as possible the actual value of the sulpho-cyanide as an iron test. The method adopted was very simple. A small quantity of polished iron wire was weighed out very accurately. In the actual process 0.0347 gramme was taken. By considering the density of iron, it was found that this weight occupied a volume equal to 0.004458 cubic centimeter. This quantity of iron was now dissolved in hydrochloric acid and water and oxidized, forming ferric chloride, which was then diluted with a sufficient volume of water to yield a solution of 100 cubic centimeters volume.

This was placed in a burette graduated to one-tenth centimeter, and three-tenths of a centimeter were drawn off, to which the potassium sulpho-cyanide test was applied, which imparted a reddish brown color to the liquid indicating the presence of iron. The solution was then made more dilute and a second portion was tested. The process was continued until only a very faint tinge of red could be detected. A small quantity of water was again added and the test applied, which, however, did not indicate the presence of iron. The quantity of iron which was detected by the sulpho-cyanide on its last successful application was found to be no greater than forty-three one-hundred-millionths of a cubic centimeter, or thirty-three ten-millionths of a gramme. This seems, indeed, to be a wonderfully delicate test, but it is only necessary to call to mind the approximately determined weight of the molecule of iron to be struck with the crudeness and inaccuracy of our most delicate methods of qualitative analysis.

The weight of a molecule of hydrogen, as given by an eminent authority, is approximately 0.000,000,000,000,000,000,04 of a gramme; by multiplying this inconceivably small number by 55, the atomic weight of iron, we ascertain the weight of a molecule of iron—0.000,000,000,000,000,000,002,2 gramme. In the sulpho-cyanide test we were able to detect the presence of thirty-three ten-millionths of a gramme of iron; dividing this number by the weight of one molecule of iron, we find that this apparently delicate test is unable to indicate to our senses a less number of molecules than 1,500,000,000,000,000. When we consider that most of our so-called tests are much less accurate than this, it is evident that in our determinations it is impossible to reach the absolute truth.—Scientific American.

THE LIFE OF CHOLERA BACILLUS IN BEER.—The German savant is eminently practical when it comes to beer, and as soon as the cholera assumed noteworthy proportions in Europe he set about determining the duration of life of the bacillus in his—the savant's—pet beverage. He found, according to the *Pharmaceutische Zeitung*, that the bacillus does not live beyond three hours in Pilsener, Patzenhofer or Munich beer; two hours in Berlin white beer; five

minutes in white and fifteen in red wine, and twenty minutes in cider. Two hours in cold-coffee decoction (6 per cent) was too much for the bacillus; but it needed five hours of a rye-and-chicory imitation to kill it. In milk which had been boiled for an hour the bacilli lived for nine days, but the tenth brought them to the end of their career. Cold tea was much the same—i. e., a 1 per cent brew, but a 2 per cent tea cleared the field in four days, 3 per cent in one day and 4 per cent in an hour. The bacilli were most partial to cocoa; they did not appear to die off in that at all.

What Is Celluloid?

Probably a great majority of the people who have used celluloid these many years have no knowledge of its composition, and never have suspected that it was simply paper, chemically treated, reduced again to pulp, and then molded into its final "form of beauty and utility." The process is not a complicated one. A roll of paper is slowly unwound, being saturated with a mixture of five parts of sulphuric acid and two parts of nitric acid, which falls upon it in a fine spray. This changes the cellulose of the paper into propylin gun cotton. The excess of the acid having been expelled by pressure, the paper is washed with plenty of water till all traces of the acid have been removed. It is then reduced to a pulp and bleached. Most of the water having been got rid of by means of a strainer, the pulp is mixed with 20 to 40 per cent of camphor, and the mixture is thoroughly triturated under mill stones.

The necessary coloring powder having been added, a second mixing and grinding follows. The pulp is then spread out in thin layers on slabs, and from 20 to 25 of these layers are placed in a hydraulic press, separated by blotting paper, and subjected to a pressure of 150 atmospheres, until all traces of moisture have disappeared. The French article differs somewhat from the American, being made from paroxylated paper, treated with alcohol, then mixed with camphor and subjected to pressure, as in the other case. But the French article has the disadvantage that it is susceptible to ignition, and that of a very energetic sort. This usually takes place at about 480° F., but may occur spontaneously at a considerably lower figure. It produces a thick, black smoke but no flame. Paper World.

The Most Explosive Substance.

The most unstable compound known to chemistry, and therefore the most explosive substance so far discovered, is chloride of nitrogen, which probably consists of three parts of chlorine united with one of nitrogen. Its terribly explosive character, which has so far prevented its accurate analysis, is due to the fact that it is a combination of one of the most active with one of the most inert elements in nature. It is a volatile liquid of brownish color and pungent taste, discovered by the French chemist Dulong, who lost an eye and three fingers in the operation. Faraday and Davy experimented on it a few years after its discovery, protecting themselves with glass masks, which were in turn shattered by explosions of minute quantities of the dangerous compound. Faraday was stunned by the disintegration of a few drops which he merely touched with a piece of warm cement. There is but little danger of chloride of nitrogen ever being used for purposes of deliberate destruction, as its preparation on a large scale is practically impossible. Its explosive force is not known, for the reason that any attempt to determine it would probably prove fatal to the experimenters. According to some authorities, the more recently discovered compound of hydrogen and nitrogen, known as azoimide, is even more explosive than chloride of nitrogen, but this substance is still too obscure for a decisive judgment to be formed on the subject.—Pearson's Weekly.

The Bite of a Snake.

The heads of most of the venomous snakes, including the "rattlers," bulge just beyond the neck. Without exception they have fangs, either always erect or raised and laid back at will. These fangs are long, sharp-pointed teeth, with a hollow groove running their entire length. At the root of each fang is a little bag of poison. When the snake bites the motion presses the poison sac, and its contents flow down through the hollow in the tooth into the puncture or wound. The harmless little forked tongue is often spoken of by the uninformed as the snake's "stinger." Now there is no propriety in the name, as the poisonous snakes do not sting, but bite their victims. There is no creature, even if brought from foreign countries where "rattlers" do not exist, but will balt and tremble at the first warning.

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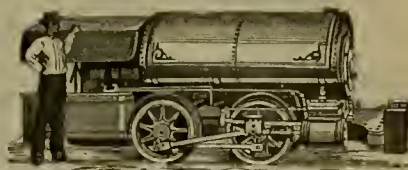
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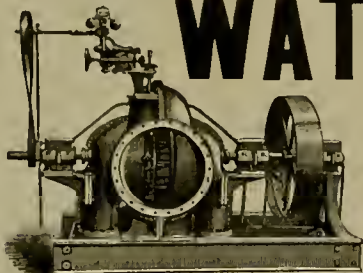
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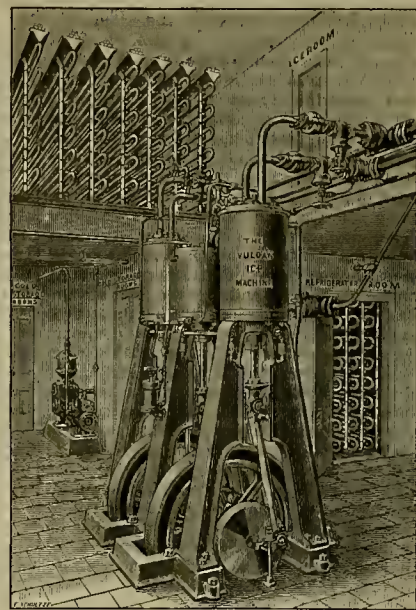
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Electricity.

The Electric Furnace.

It is not a little singular, says London *Industries*, that the first serious attempt to use the heat of the electric arc, though proposed for reducing purposes half a century ago, was in a purely industrial process, namely, that of Cowles for the production of aluminum-copper alloys, instead of for purposes of research such as readily suggest themselves. The oxygen furnace, as distinct from the oxy-hydrogen blow-pipe, has been in the hands of every technical chemist requiring high temperatures for some time, but the number of those using the more powerful arrangement, which owes its origin and efficiency to the ease with which electrical energy can be converted directly and automatically into heat, is not yet great. M. Moissao, whose name is well known on account of his investigations on fluorine—the isolation of which he is said to have effected, although that it is not yet placed beyond doubt—has lately turned his attention to the behavior of various refractory oxides when subjected to the intensely high temperature that can be obtained from the arc under proper conditions. The material of which the furnace was made was lime, as in the case of the arrangement ordinarily used for melting platinum by means of an oxy-hydrogen jet, but in this instance the single entrance hole was replaced by two, disposed opposite each other for the reception of the electrodes, as in the Cowles furnace. To the most powerful apparatus used a current of 450 amperes at a pressure of 70 volts was employed, and a temperature of about 3000 degrees C. was attained. It must be remembered, in comparing this temperature with those that are given in text books as the fusing points of refractory substances, that recent improvements in pyrometry have shown that all temperatures above 1000 degrees C. have been hitherto over-estimated, sometimes grossly, and that the highest temperature industrially reached is about 1500 degrees C., and even this is not common. The results obtained by means of this electric furnace are, as might be supposed, of the most remarkable character. At a temperature 2500 degrees C., lime, strontia and magnesia crystallize in a few minutes, and if that temperature be exceeded, the material of which the furnace body is made runs down like water. One would like some information as to the purity of the lime before accepting this statement unreservedly, as the presence of inconsiderable quantities of impurities, notably acid oxides, materially affects the refractoriness of lime and other basic materials. However this may be, it appears that the lime is reduced to calcium at this point, another instance being afforded of the enhanced reducing action of carbon at high temperatures which found application in the Cowles furnace, even against the teachings of thermo-chemistry, arguing from data true at more ordinary temperatures. Another phenomenon, equally characteristic of reactions taking place under such conditions, is the formation of a carbide of calcium, which is fusible at red heat. Magnesia affords no solution of the problem of producing a furnace capable of withstanding the action of a powerful arc, as its fusion can be accomplished in the same way as that of lime. Crystallized alumina has been familiarized to us by the researches of Fremy and Verneuil on the production of artificial rubies, and the announcement that at a temperature of 2250 degrees C. it fuses and crystallizes on cooling is less startling than the news of the comparative ease with which molten lime may be obtained. The addition of a small quantity of chromium oxide causes the formation of small rubies, but they are inferior to those that have been already produced by other methods. If any deduction can be drawn as to the method of their production in nature, it is rather that the mineralizing process has been less intensely plutonic than one was formerly inclined to believe. The most noteworthy fact in connection with the behavior of alumina in the electric furnace is that on continuing the treatment it can be completely volatilized. This is not altogether without parallel, as some time ago an account of experiments by Seger was published in these columns, which went to show that silica was similarly volatile at very high temperatures. Chromic oxide, manganese dioxide, ferric oxide, nickel oxide and cobalt oxide all underwent change, the higher oxides being reduced to the lower compounds and the resulting products crystallizing at temperatures below the maximum obtainable. Titanic acid could also be crystallized, fused and volatilized according to the temperature used. Zinc oxide volatilized freely, and was deposited in long, transparent needles.

Electricity in the Kitchen.

Electric cooking is now coming into a commercial stage, says the *Electrical Review*. We must, of course, in electric heating, allow for all the waste in converting the coal at the central station into heat and the heat into steam and the steam into current and the incidental heat losses of line transmission. But let us suppose we are waiting for a simple breakfast, and score down the items rolled up on our accounts current by Chloe, in the kitchen, while she is converting the raw material of the butcher and grocer into manufactured product that will meet the approbation of our palates.

First, let us suppose she is operating the coal range. Item—One bundle of kindling to start her fire, two cents; item, one-half of daily coal outgo (one ton per month), ten cents; total, twelve cents. Let us thrust out of view for the present why she uses so much coal, remembering only the cardinal and imperious fact that she gets away with one ton of coal in one month to operate her range, for which our good cash falls with a cold, dull plunk into the pockets of the coal barons. Now let us use electric utensils for the same work. We are having chops, soft-boiled eggs, griddle cakes and coffee—a simple, wholesome and frugal diet if Chloe can cut down the heat tariff. We will first heat two quarts of water, which will fix matters for the coffee and the eggs. Item, four amperes at 110 volts, ten minutes, 1½ cents; item, chops, seven amperes at 110 volts for ten minutes, two cents; item, 15 griddle cakes, five amperes at 110 volts for ten minutes, 1½ cents, making the aggregate cost for heat 4½ cents, at the end of which time off goes the current and the expense stops.

The figures here used are based on the use of the coffee-pot, boiler and griddle, electric utensils, and are substantially correct. Their import is simply this—that there are two sides which must be considered in the matter of electric heating. An oven will furnish for nine cents the heat necessary to send to the table a five-pound roast of beef in 35 minutes, or a twelve-pound turkey in 45 minutes—that is to say, the current is flowing for those periods. The actual baking or roasting goes on longer because, after the oven is heated to 300 degrees or more, as required, the current may be cut off and the process of cooking will continue until the roast is "done."

A Traveling Telephone.

The introduction of general telephones in large apartment houses and office buildings is not so rapid as it should be. This is possibly due to the fact that there has been no means for bringing the telephone to the occupants when the occupants would not go to the telephone.

Here is a bright idea in the use of telephones in high buildings: By the aid of the conveyor the instrument may be available for use on any floor of the building. The ordinary telephone set, comprising magneto bell, transmitter, receiver and battery, is mounted upon a conveyor carriage sliding between grooved sides of a light elevator structure extending vertically between the several floors where the service of the instrument is desired. The conveyor is connected by a rope passing over a pulley at the top of the elevator slides with a counterweight. The electrical connection of line and ground wires is made by spring brushes constituting the terminals of the instruments bearing upon metallic bands or strips attached to the front of the elevator frame, or, if preferred, may be effected by flexible conductors after the manner of annunciator wires to a passenger elevator.

Suitable openings are required in the floor next to the wall where the conveyor is erected to allow of the passage of the telephone set, and a tray may be attached under the battery box for carrying letters or small parcels. To facilitate movement of the conveyor a draw-cord is made to extend downward from it, terminating at the under side of the counterweight. The same principle is also applied to the horizontal movement of a telephone set in establishments spread out upon a single floor, the rails upon which the carriage moves being in this instance utilized as circuit connections.—*Electrical Review*.

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T. B. LE SIEUR—Mendocino and Lake counties.

Useful Information.

Labor in England.

Robert Giffen, the well-known statistician, was called upon to testify before the Royal Commission on Labor as the assistant secretary to the Board of Trade. His remarks are reported as follows to an English paper:

The great bulk of the working classes in general employment were shown by the statistics collected to receive an average wage of between 20 shillings and 30 shillings a week. A large number were paid over 30 shillings, and about 25 per cent under 20 shillings a week. Statistics of domestic service had not yet been touched in the tables, although such employment engaged from a third to a half of all women and girls earning their livelihood. The average remuneration of women in non-domestic service was £32 a year, while the remuneration in domestic employment was nearer £50. The average earnings of manual labor were: For men, about £60 per annum; for women, about £40; for lads and boys, £23.8, and for girls, £23. The aggregate earnings of manual labor were about £630,000,000, as compared with £640,000,000, the amount earned by the other classes of labor and coming within the income tax. Fifty years ago half our working population consisted of agricultural laborers, and their work was paid for at a low rate. At the present time less than one-fifth of the population are agricultural laborers. This substitution of better paid for worse paid employments, and possibly the depreciation of money since 1850, had improved the mass. The greater part of the rise in wages occurred before 1872. There had been a great fall since, probably of from 25 to 30 per cent, but as compared with 50 years ago wages were now much higher. He was of the opinion that the statistics as to strikes ought to mitigate the impression with respect to the seriousness of the mischief occasioned by strikes. The loss of wages occasioned by strikes did not amount to more than a fraction of one per cent of the total wage earnings of the community; he believed it was about one-fourth or one-fifth of one per cent. The average duration of strikes was about three weeks. When a strike lasted for a shorter period than three weeks it did not follow that, although the wages were suspended for that period, the workmen concerned would at the end of the year have received three weeks' wages less than they would otherwise have obtained, inasmuch as three weeks' idleness could in many trades be made up at other times. Under these circumstances the total loss of wages occasioned by strikes would be even smaller than he had stated. He thought, therefore, that the directly bad effects of strikes might have been somewhat exaggerated. He considered, however, that strikes had indirect effects which were very important, such, for instance, as the loss of some particular trade with which there was foreign competition. The total membership of trades unions was 871,000 out of a total adult population of 7,250,000, and the annual income was nearly £1,200,000, or about 27 shillings and 6 pence per head of the members.

How Some Fires Originate.

A list of unusual and curiously caused fires has been compiled and the *Railway Review* mentions some of the number. It includes a factory fire which was traced to a railway truck, an overheated axle having thrown a car from the track and set fire to a petroleum tank from which the flames spread to the building. An instance is given in which a bucket of greasy waste was ignited by the friction of a belt which sagged against it. In a harmless case of spontaneous ignition of oily waste, this material, with some wood chips, had been thrown into the fire-box of an idle locomotive, shortly after which the workmen were surprised by the blowing-off of steam by the engine. Another fire was due to oily waste in a manner which could not well be foreseen. Only heavy mineral oils were used, and a place was provided for the waste, but a cock-chaffer crawled from the receptacle directly to a gas jet, when the creature was quickly consumed, and the oily cotton filaments adhering to its body spread the fire. Well-known incendiaries are photographic and other lenses which act as burning glasses, and bright, tight plates, which serve as concave mirrors. A plumber's exploit consisted in applying the flame test to a newly-made joint in a gas pipe, then covering the pipe without noticing a small, blue flame, which was discovered some six weeks afterward, when the leak had become somewhat enlarged. A nail glanced from a carpenter's hammer into the conveyer of raw material

in a jute factory, rubbed against the drum and produced a spark which set fire to the place. A flood burned one factory by causing a pile of iron filings to oxidize so rapidly as to become intensely heated. A stream from the firemen's hose started a second fire in New York while putting out one in a small building, a neighboring shed containing quicklime having been penetrated by the water.

Pains in the Heart Region.

Pains in the region of the heart are common, and the general dread of this disease makes many people imagine that they have heart disease when there is any local affection in this region. Many who think they are suffering from heart disease have their pain caused by the pressure of the stomach when distended with food or gas. Neuralgia or muscular rheumatism of the chest-wall will give similar pains in the heart region, which may readily be thought to come from heart disease. The obscurity which involves the whole subject of the heart's nervous system makes it impossible to tell definitely about such pains. Various drugs, which will slow the action of the heart, will sometimes give relief. But it is necessary first to ascertain positively if the heart is really affected.

Those who suffer from such pains can frequently discover the cause better than the physician. There is no reason why such pains should give cause for alarm. Even though neuralgia or rheumatism is causing pain in that region, it is not essentially dangerous. The best plan at such times is to keep in a dry place, avoid draughts of wind, rain or wet weather, and remain in a lying posture for hours. This gives the heart rest and gradually strengthens it. Hot, dry applications over the region are always good. Those suffering from neuralgia and heart disease should always apply hot flannels over the region of the heart when the pain is severe. This will prevent the neuralgia from settling in this organ, the most dangerous spot.—*New York Ledger*.

Why Lost People Walk in Circles.

The fact that people lost on a desert or in a forest invariably walk in a circle is due to a slight inequality in the length of the legs. Careful measurements of a series of skeletons have shown that only 10 per cent had the lower limbs equal in length; 35 per cent had the right limb longer than the left, while in the other 65 per cent the left leg was the longer. The result of one limb being longer than the other will naturally be that a person will, unconsciously, take a longer step with the longer limb, and consequently will tend to the right or to the left, according as the left or right leg is the longer, unless the tendency to deviation is corrected by the eye.

The left leg being more frequently the longer, as evidenced by measurement of the skeleton, the inclination should take place more frequently to the right than to the left, and this conclusion is quite borne out by observations made on a number of persons when walking blindfolded. Further, on measurement of the arms, it is found that in 72 per cent the right arm is longer than the left, while in 24 per cent the left arm is the longer, showing that a considerable majority of persons are right-handed and left-handed. The inequality in the length of the limbs is not confined to any particular sex or race, but seems to be universal in all respects.—*Pearson's Weekly*.

DR. S. W. MITCHELL, with others, has been making experiments with the venom of different serpents. He has found that, aside from its poisonous qualities, it contains living germs which have the power of increasing enormously fast. So, you see, when an animal is bitten these tiny bits of life, entering with the poison, cause harmful action to begin almost at once. Dr. Mitchell has found that the nervous center controlling the act of striking seems to be in the spinal cord, for if he cut off a snake's head and then pinched its tail, the stump of its neck turned back and would have struck his hand had he been bold enough to hold it still.—*St. Nicholas*.

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The Tale Told by the Teeth.

The development of the molar teeth of the human jaw is a history which is claimed to reveal some interesting points in the genealogy of man and the relationship of races. It is now some five years since Prof. Cope urged the opinion that the tubercular forms usual in the cusps of human molars point to a reversion to the type of dentition prevailing among the lemurs, and the inference was near at hand that in the discussion of the evolution of the genus *Homo* we had better look toward a lemurian rather than a simian progenitor.

His statements were studied closely by several German writers, and also by Dr. H. F. Osborn of Columbia College, who, in a recent number of the *Anatomischer Anzeiger* (No. 24, 1893), presents a summary of results, some of the weightiest taken from his own researches. He shows that the primitive form of the mammalian molar was a single cone, to which all the other cusps have been successively added. Four, five or six cusps, and various intermediate tubercles, appear on the molars of some of the primates. The tubercles of the human molar may be considered a reversion to the lemurine type, and Dr. Osborn maintains that, in comparison, the quadratubercular form was a comparatively recent acquisition compared to the tributercular.

The attempted application of these traits to racial anatomy cannot be said to have resulted in anything definite. It may vaguely be affirmed that in the molars of the lower jaw, which are the more distinctive of the two, four cusps are more frequent in the "higher" and five in the "lower" races. This is the opinion of Dr. Topinard in his latest writings on the subject. He seems to have little respect for the lemurian theory, referring to these as "animaux de transition discordante, a type non arrete."

Prof. Topinard has taken up the subject with his usual thoroughness in an article 70 pages in length in *L'Anthropologie*, December, 1892, entitled "De l'Evolution des Molaires et Premolaires chez les Primates et en particulier chez l'Homme." In this he withdraws somewhat from the position he took in his "L'Homme dans la Nature," and concedes that the molars must be traced back, step by step, to lemurian forms, but claims that the fundamental types of the molars are identical in man and the anthropoids; that these latter belong to the monkeys, while man as he is at present constitutes a sub-order in the general order of Primates.—Science.

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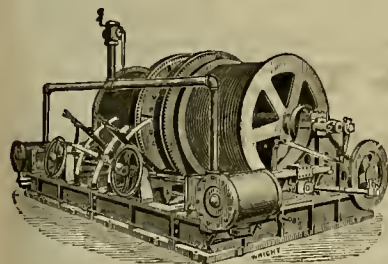
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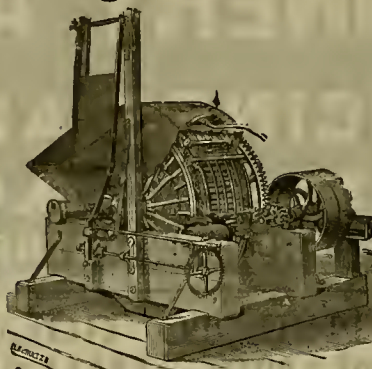
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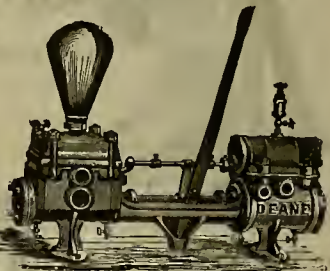
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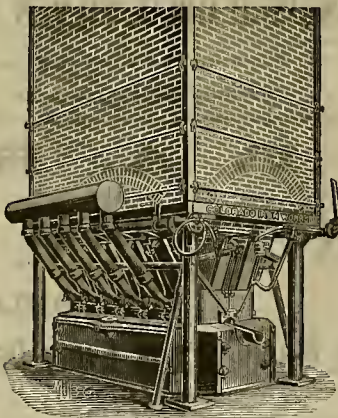
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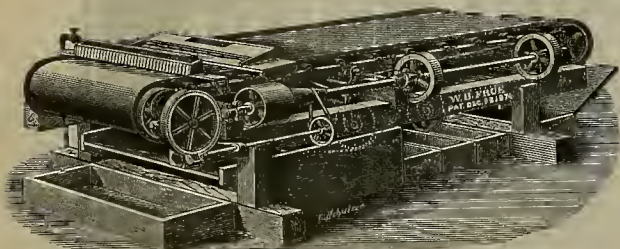
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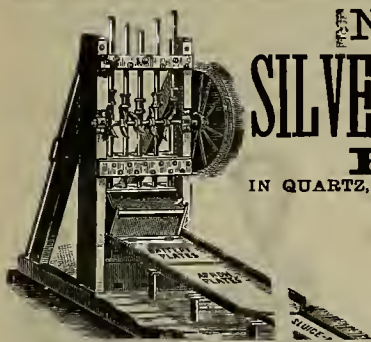
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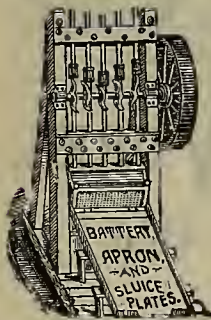
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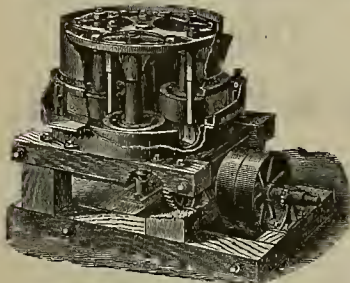
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PIONEER DISTRICT.—Amador Record, March 16: Henry Tumalt shipped ten tons of ore to Sydney James' mill last week, which netted him \$900. He will now run double shifts and with the facilities at his command can easily take out ten tons a day. The ledge is 18 inches wide. He can have the ore hauled to James' mill for \$2 per ton. Milton Bearce struck a quartz ledge 12 inches wide last Tuesday. The ore is of about the same quality as that mined by H. Tumalt. The Irma Co. has cut the station at the 200 level and run a drift for 30 feet and exposed some very rich ore. While making the station, sinking was temporarily suspended, but will be resumed again next week. Wm. Floyd, of Nevada City, a miner of wide experience, has been employed as foreman of the Irma mine.

Calaveras.

THE HARRISON MINE.—Calaveras Chronicle, March 18: The developments being made at the Harrison mine on Esperanza creek, which was recently bonded by the Sandy Bar Co., are extremely flattering. In the tunnel run to tap the ledge at a distance of 60 feet, a four-foot ledge was struck, showing rock running from \$25 to \$100 per ton. The nearest found is fully as rich as that found at the time of discovery—a soft laminated quartz showing free gold in most every piece. A lower tunnel, run to tap the ledge 275 feet below present workings, is now being run, day and night shifts being employed. Machinery, cars, trackings, etc., passed through town this week en route to the mine. Mr. E. H. Davison of this place is superintendent.

AROUND MURPHY.—Calaveras Prospect, March 18: Collier and Canyon have completed their first 50-foot contract upon the O. K. mine, and will continue on to the completion of 100. The Norfolk mine is still in operation, and, though some difficulty is experienced in the excessive quantity of water, everything is proceeding diligently. It is reported currently that Haggin & Co. of Sheep Ranch have purchased the water ditch and works of Ide & Co. of Sheep Ranch. How true the report is has not been learned. Daniel Thompson was in town again on Monday, and is in high spirits over the quartz discovery upon his ranch, two miles north of town. The ore, from his description, is showing free gold and also contains a large percentage of silver. Wm. Dodson, an old-time prospector in this section, has one of the finest prospects in this section of the country. The rock is all of high grade and pronounced richness, and the proper delineations of a regular milling lode are unmistakable. The mine is situated about three miles west from town.

INDIAN CREEK.—It has been whispered for some time past that the famous mine on Indian creek, owned by Martin Bozovich and Joe Tentamastine, was under negotiation for bond or sale. The person whose attention has been drawn to the mine, it is said, is no other than W. H. Cleary of Sheep Ranch, agent and superintendent for the famous J. B. Haggin mine of that place. The matter has been kept rather secret, but it is now becoming noised about, and a general interest is being aroused. This mine has been noted in the past for its great richness. One of the owners paid a visit to Europe, and it is stated upon eminent authority that both men have become rich. They have quietly worked their mine for years past, and no one except a visitor there or an intimate acquaintance ever knew much of the mine's true worth. It seems, however, that the gentleman above referred to has been wide awake in noting the valuable mines in Calaveras, and his personal inspection of nearly all of them has been made quietly and unobtrusively. If the sale of the Bozovich mine takes place, every one can congratulate himself that the mine will have gone into able hands, not only from a scientific and practicable view, but from a monetary standpoint. The Bozovich mine is situated about two miles above the Esmeralda, on Indian creek.

Nevada.

SUSPENDED OPERATIONS.—Grass Valley Union, March 16: The Sanvee mine, better known as the Golden Treasure, and situated beyond the Empire mine, has suspended operation for a period of two months. A surplus of water is the cause of the mine being closed down. It will be started again in the spring, however.

PROSPECTING.—The main shaft of the St. John mine is down to a depth of 300 feet, and it is the intention of the company to sink 200 feet deeper, in order to thoroughly prospect the ground.

ANNUAL MEETING.—Grass Valley Telegraph, March 17: The annual meeting of the Seventy Mining Co. was held in San Francisco Wednesday and the following officers were elected to serve for the ensuing year: A. P. Bacon, president; Peter Amiranz, vice-president; J. Bertz, F. E. Berge, A. C. Ellis and Geo. L. Payne, directors. J. J. Scoville was re-appointed secretary, and G. A. Taylor, superintendent. The reports of the financial condition of the company show clear sailing for many months ahead. The work of development is being vigorously prosecuted at the mine, which is considered a very valuable property.

TO WORK TAILINGS.—A San Francisco company has a new and simple process of working tailings from quartz mills, and its scheme is to put in its plant on Deer creek, near Waite's ranch, Nevada county, and work over the tailings from the Providence, Champion and Mountaineer mines. It will pay the mine-

owners a stated price per stamp for the exclusive right to work the tailings from their mills, and have fair prospects of making something out of them. The Chinese have heretofore had a monopoly of such mining here, and they make it pay, even by the laborious process of cradle and rocker.

KENTUCK MINE.—Grass Valley Telegraph, March 16: The prospects out at the Kentucky mine are now very flattering. There is a large ledge down at the depth of 100 feet and it is looking exceptionally fine. The owners are very much encouraged over their present prospects. Dan Deeble and company are now working on the mine and have the highest opinion of the property, and they are excellent miners. The mine is owned principally by Capt. John Carter, foreman of the Idaho, and by John M. Thomas, of the Citizens' bank. The Kentucky is within a "stone's throw" of the great Idaho mine, and is just a little east of north from that famous property.

KING SOLOMON MINE.—Union, March 18: Work on the King Solomon mine is steadily progressing under the able supervision of Supt. Brockington, who informed a reporter yesterday that in about a month the company expected to have its fine new mill in operation. There is at the present time some 30 or 40 tons of rock in the mill, and by the time the mill is started there will be at least a hundred tons of quartz on hand. Work on the ditches will be commenced as soon as the weather permits and the water-pipe will also be rapidly laid. The mill will be run by a Pelton wheel and will use about 25 inches of water.

Mono.

RICH STRIKE AT BENTON.—Bridgeport Chronicle, March 18: A Benton correspondent sends us the following in regard to a recent rich strike at Benton, in the southern part of Mono county: "Owing to the low price of silver many of the owners of low-grade mines have turned their attention to prospecting for gold. One of these prospectors, James Otis Wheeler, has found one of the richest gold-bearing ledges that has ever been discovered in this section of the country. The big discovery is situated about nine miles in a south-westerly direction from the small and lively town of Benton, Mono county, California. James Otis Wheeler, the lucky discoverer of this bonanza, is an old-timer, having come to California in the early days of gold. He is therefore well versed in all the forms of gold mining and says he has never seen a better prospect. Notwithstanding the drawback of a few feet of snow which fell the week after he made his find, he is vigorously prosecuting the work of opening up the mine. He will erect a mill and proceed to work the ore as soon as the water permits, and at present secures enough gold to defray all expenses by the use of mortar and born. Enterprising prospectors are already staking out claims adjoining, notwithstanding the inclemency of the weather, and it is confidently expected that by the opening of spring one of the biggest rushes ever seen will take its way to the new discovery. The ore is what is called wire gold, and is so rich that a piece cracked with the hammer will be held together by the gold. The first assay went \$9000 a ton, and it is expected that better will be found."

San Bernardino.

VANDERBILT DISTRICT.—Cor. White Pine News, March 18: There are two great mineral districts adjoining, namely, New York and Vanderbilt in San Bernardino county, Cal. The first-named formation is lime and porphyry. A Denver company is now operating there with a force of 80 men bolder forth in dugouts and tents. The ore runs about 35 ounces in silver and from 30 to 40 per cent lead. It was originally claimed to be a gold camp, but after its purchase found to be the contrary. They are busy making roads and developing a group of eight mines and storing ore until the advent of the railroad now in course of construction.

The Vanderbilt formation is gneiss or quartz, and its appearance is certainly indicative of a good, strong mineral belt, and is situated about 35 miles from Gaff's station on the line of the Atlantic & Pacific, and seven miles westerly from New York, and bids fair to be an extensive camp. Two of the principal mines are down about 75 feet, with drifts run for 60 feet, showing veins quite continuous but narrow and best quality of ore shipped has averaged about \$60 gold and \$35 silver—reckoned as a gold camp—all the prospects showing two-thirds gold. The ore is of a sulphuretted character and water is coming in at aforesaid depth. Springs are close by and a number of millsites are located there.

Lyle has bonded the Gold Bronze for \$40,000 and the Gold Bar is bonded for \$75,000, and it is now a foregone conclusion that said sales will be consummated as they have taken up two millsites for the purpose of reducing ore within a mile from the mines.

The camp is located in a narrow wash, with about a dozen tents, consisting of one lodging house, three boarding houses, two saloons, one general merchandise store and Chinese laundry. Only 18 men are employed regularly, but upwards of 200 men are in the district prospecting, and for a 90-day camp it is quite lively.

Shasta.

FROM LOWER SPAINOS MINES.—Cor. Shasta Courier, March 16: For the last few years the miners of this district have been pleading for some process by which our rebellious ores can be worked for a nominal price. Very little ore in this vicinity is called free-milling. A large portion of our rebellious ores will not work in a free mill more than 20 or 25 per cent of the assay value. There is strong evidence of a plant being placed somewhere on the Sacramento river this summer. I hope some of our mining capitalists will see and act upon such an important enterprise. I am confident the ore could be worked at Middle Creek station

for the price now being paid for shipping to the Selby Works. To build such a plant at Middle Creek station would be a prudent move and a Godsend to this vicinity. There is a vast area of mineral deposits lying west of the Sacramento river. One great drawback in this vicinity is that our home capital too frequently engage in kicking the nose off their own faces. We certainly have a variety of kickers. Some kick because they do not possess the whole district. Some have a dozen or more locations and kick because they haven't more. Others kick for not having a mine in close to a bar-room stove. Some have good prospect, others have none, and that is the way the world first begun. We are all living under one canopy of heaven, and why not unite ourselves and use our utmost endeavors to build up our mining industry and be hopeful, and use our personal efforts in the advancement of our mines and homes. Our faithful ideas will convey to others the importance of such work. All that is lacking now is money. To overcome this detriment we must induce capital and a change of workmen to step in here and take the places of so many old stiffs, as they are familiarly called. This will improve the present condition of affairs.

Trinity.

GRAVEL.—Cor. Trinity Journal, March 16: Mr. Keach has on his place about 75 acres of gravel, which is said to be very rich wherever prospected. His ditch is about a mile long and the water is brought to where he is mining with a pressure of only 30 feet. The banks are about 25 feet high and the bedrock flume is 11 boxes long and 30 inches wide with a splendid dump of over 100 feet of perpendicular fall into the river. There is a streak of blue gravel in the bank, which, we are informed, is very rich, as much as 75 cents per pan having been taken out. Owing to the fact that the water supply is very limited but a small piece of bedrock can be stripped during the season's run. Three or four 15-minute runs per day can be had, but for the amount of work done it is said to pay well. About a mile below, on the same side of the river, a couple of Swedes are engaged in mining in a small way, and are believed to be doing well.

GLOBE MINE.—Cor. Journal: Perhaps you or the readers of the Journal would like to know something of the snowy regions. The snow here is 15 feet deep at present and still falling at the rate of one inch an hour. The boarding-house at the mine was visited last night with a snow-slide, but no damage was done except a big scare for the boys. It rambled over the house like an omnibus on the streets of New York. On the divide crossing over to the Globe mine the snow has drifted to the height of 75 feet.

Tuolumne.

BLACK OAK.—Tuolumne Independent, Mar. 16: A steel cable, 700 feet in length, is on the road for the Black Oak mine. When it arrives they will commence sinking deeper. There is a splendid vein in the bottom of the shaft. The very rich vein recently discovered in shaft No. 44 will also be developed. The ten-stamp mill will soon be pounding away on rich ore. The mine gives promise of yielding large returns, better than ever in its history.

DISCOVERY.—Calaveras Prospect, Mar. 16: Jno. S. Sublet, from Stanislaus district, was in town again Sunday. He had with him specimens of ore from an entirely new discovery, and it is now apparent that that region is fast becoming worthy of distinction for its good bearing ledges. Good reports come in regularly from there and the attention of capitalists has been enlisted, and they are having much prospecting done that promises to aid materially the development of the district. The mines above mentioned are in Tuolumne county and east of the group of Collier mines, situated in Calaveras county.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, Mar. 18: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stopes, from the 10th to the 14th floors above the sill floor of this level. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connection with the north drift on the 1500 level. Also extracting a few tons of ore from the old stopes east of the main south drift. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. The north drift started 150 feet in from the northwest drift has been advanced 6 feet; total length, 51 feet; in a porphyry and quartz formation of a very low assay value. The south drift from a point 52 feet down in the winze started in the west crosscut has been advanced 12 feet; total length, 40 feet; continuing in a porphyry and quartz formation of very low assay value. From this winze, at a point 12 feet below the sill floor of this level, we are working in the old stope timbers and extracting some ore therefrom. Have extracted during the week from the 1500 level stopes and 1650 northwest drift openings and raised to the surface 565 cars of ore, about 5500 tons. Shipped to Morgan mill 747 50-2000 tons of ore. Average assay value, per railroad car samples, \$30.78. The average assay value, per battery samples, of all the ore worked at that mill during the week (545 tons) was \$27.62 per ton.

OPHIR.—500 level—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level—Have put in a chute to hold the rock taken from the winze being sunk below this level. The winze has been sunk four feet in a por-

phyry and quartz formation, showing an average assay value of \$20 per ton.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze has been extended 18 feet; total length, 49 feet, continuing in a softer porphyry formation showing clay slips. Jointly with the Ophir Co. on the 500 level from the Ophir shaft continue doing some necessary repair work in the west drift from the main shaft.

UTAH.—340 level—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 18 feet; total length, 183 feet; continuing in porphyry, clay and quartz formation.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 18 feet, making the total length 218 feet; the face is in porphyry. Union shaft—The joint Sierra Nevada and Union west drift, 900 level, has been advanced 23 feet, making the total distance west of the joint shaft 3023 feet; the face is in clay and porphyry.

ANDES.—North drift from east crosscut No. 1 north on 420 level advanced 14 feet; total length, 160 feet; formation quartz.

GOULD & CURRY.—200 level—West crosscut No. 5 started in northwest drift, 432 feet from main west drift, has been advanced 17 feet, passing through hard porphyry; total length, 383 feet. Suro tunnel level—The joint east crosscut with Best & Belcher Company has been extended 22 feet through quartz and porphyry; total length, 83 feet.

BEST & BELCHER.—200 level—West crosscut No. 1, started in northwest drift, 170 feet from our south line, has been extended 16 feet; total length, 130 feet; face in quartz. 900 level—At a point in west crosscut No. 3, 20 feet from top of upraise No. 1, 1000 level, started a south-west drift and extended same 20 feet, passing through porphyry. Suro tunnel level—The joint east crosscut with Gould & Curry Company has been advanced 22 feet during the week, passing through quartz and porphyry; total length, 88 feet.

HALL & NOACROSS.—We are repairing the south compartment of the main shaft below the 1200 level. Main Incline—We continue making the necessary repairs. 1400 level—Have finished retimbering the main north drift on this level and are now making some repairs to the station. 1800 level—West crosscut No. 1 from the main south drift was advanced 10 feet; total length, 193 feet. The face of this crosscut has reached the west wall and stopped. During the week have started a new west crosscut on our south boundary and advanced the same 10 feet; face in porphyry. West crosscut No. 4 from main north drift was advanced 10 feet; total length, 240 feet. Have discontinued work in the face of this crosscut. In this crosscut, at a point 115 feet from main north drift, are cutting out and preparing to start an upraise on some promising streaks of quartz. The north prospecting drift from end of west crosscut No. 3 was advanced 17 feet; total length, 42 feet; face in quartz and porphyry.

CRUMLA.—The north drift from the south line, 550 level, is out 264 feet; face is in quartz that gives low assays. Are still retimbering the two north compartments of the main shaft above 930 level. The east crosscut near the south line, 930 level, is out 25 feet; face is in porphyry and streaks of quartz.

POTOSI.—Have completed repairs to east crosscut No. 3, 350 feet south of north line, 850 level, and commenced work in the face, which is now out 285 feet; face is in porphyry. The east crosscut opposite Potosi winze, 930 level, is out 315 feet; face is in porphyry. The north drift from east crosscut, 930 level, is out 40 feet; face is in porphyry and streaks of low-grade quartz. The north drift from top of raise, 1000 level, is out 205 feet; face is in porphyry and low-grade quartz. The south drift from top of raise, 1000 level, is out 248 feet. From the face of this drift are running a crosscut east, which is now out 28 feet; formation porphyry. No work has been done on the 1800 level during the past week on account of retimbering the Ward shaft. Extracted and sent to the mill the past week 448 tons of ore from the 550, 930 and 1150 levels. Milled during the week 500 tons; on hand at mill, 82 tons and 500 pounds. Average battery assays, \$21.60. Average car sample assays, \$25.04.

KANTOOK.—From the stopes above the 160 level we continue to extract from two to three tons of ore per day of the average value of \$30 per ton as per car samples. The south drift from the Jacket east crosscut on 1100 level is in 165 feet and continues in ore of fair quality.

NEW YORK.—The winze below the 650 level is down on the slope 105 feet; the bottom is in quartz showing occasional bunches of good ore. The west crosscut from the southwest drift, 850 level, is out 105 feet; face is in low-grade quartz and porphyry.

SILVER HILL.—The southeast drift, 450 level, has been advanced 5 feet, through hard porphyry; total distance from north line, 72 feet.

BULLION.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

ALPHA.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

EXCHASQUER.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

WARN SHAFT.—No work has been done on the 1800 level during the past week, as we are yet engaged in retimbering the shaft.

OCCIDENTAL.—Have started a crosscut from the main north drift on 750 level at a point 675 feet north of No. 1 winze. The face shows streaks of good ore. The winze from south

drift, 750 level, is down 111 feet; bottom in low-grade quartz. The Zedig drift, Suto tunnel level, has been extended 12 feet; total length, 870 feet from main tunnel; the face continues in hard porphyry.

Yellow Pine District.

THE CLAIMS.—Cor. White Pine News, Mar. 18: Now from Vanderbilt district cross the deserts and dry lakes, distant 45 miles to Goode Springs, thence by trail to Keystone in the center of Yellow Pine district, six miles; total distance from Goff on A. & P. road, 96 miles by said route, though by regular wagon road it is 110 miles, through deep, gravelly, sandy washes, and is equal to 250 miles of your northern routes for traveling. Yellow Pine boundaries are nearly 100 miles, and, from my limited travels and observations, is the most extensive and richest mineral belt unexplored and undeveloped within the confines of the Union. Its aspect is certainly very discouraging especially to a tenderfoot, and quite apt to drive him away into some more desirable clime. The formation is lime of varied character and porphyry; veins are quite irregular and country badly broken up in all directions by the volcanic disturbances of a million years or more ago. The Keystone mine is about the only mine developed to any extent, being 150 feet deep at present, with three tunnels in said distance, and has paid from grass roots, as from Aug. 1, 1892, to Jan. 1, 1893, it has yielded \$35,000, after a deduction of \$52 per ton freight, and if under wide-awake business management, would do still better. Another promising mine is the Golden Chariot, which is now shipping ore averaging 40 ounces, only 20 feet deep, with a 60-foot tunnel. Thence comes your scribe with a pet girl entitled the "Marceon Clemantina," have sunk an 11-foot shaft thereon; have extracted about six tons therefrom, with assays of 26 ounces gold per ton; width of vein in bottom about two feet, and four feet in length; walls are both lime, but expect that by sinking 30 feet I may strike contact; I own five-eighths and have bond on balance, so I intend to rustle a sale if possible to Denver people who have made a \$20,000 offer, but consider it too low from the showing of vein for 200 feet on surface and the outcrop generally of stringers observable in all directions, which, by judicious work, may show up much better than expected, as experts who have examined it claim it may exceed the Keystone, and is now reckoned second best with such little work done. The gold belt is ten miles square, ledges all running north and south, the gangue of the ore being a red oxide of iron, quite favorable for smelters for the flux therein. Outside of said belt are apparently inexhaustible mountains of heavy lead, carbon sulphate and carbonates, ranging from 20 to 80 per cent and running from 3 to 60 ounces in silver, clear beyond the Nevada State line. The Kansas City and Pueblo smelting companies have men early in the field, looking up and reporting on the claims. The field is not half prospected, though generally supposed to be all located. Only a few white men have been here, most of them our yep friends from Zion. The Nevada Southern Railway Co., incorporated in Denver, is now building into New York district, has 14 miles of rails laid and 30 miles graded, and calculate to reach Goode Springs by June 1st next. They have ordered another survey of 90 miles beyond and will push the work ahead. Look out for an immense boom as soon as the iron horse reaches this district, and knowing capitalists are sending men in here to explore the field in all directions, and as silver declines the gold fields must be invaded. Mesquite Springs is only ten miles from here, and an abundance of water can be had by sinking 3 to 12 feet deep. The population of this camp at present is 77,000. Water costs four cents a gallon. This is a hard country to get in or out of. Of horses there are none; even the patient burro is scarce, the few here being utilized in hauling water.

Tuscarora District.

NAVAJO.—Times-Review, March 16: The slopes above the 350-foot level are looking about the same and the slope above the 150-foot level is yielding a little very good ore.

BELLE ISLE.—Line crosscut, 250-foot level, extended 5 feet. North drift from same extended 6 feet. The slopes are looking and yielding about the usual quantity of ore.

NORTH BELLE ISLE.—North drift, south 300-foot level, extended 6 feet; no change. The slope above this level continues about the same.

Aurora District.

TO RESUME.—Walker Lake Bulletin, March 15: Private letters from John Niede of Aurora to a citizen of Hawthorne convey the cheerful news that \$300,000 have been raised in London for the purpose of resuming work in the Con. Emerald mines of Aurora. We are informed that it is the purpose of the company to run a tunnel from the lime kiln, a distance of a mile and a half, and thereby drain the mines several hundred feet below their present deepest works. That this work will prove the existence of large and paying ore bodies is almost certain. Mr. Ann, the director of the company, will arrive about May 1st, and he will personally superintend the work. In case the developments should warrant it, a mill will be erected on the ground to be run by electricity transmitted from the Walker river, a survey for which has already been made. Speed the good work!

ARIZONA.

NOTES.—Mohave Miner, March 16: The miners are all making money on mines in Indian Secret district. The reported gold strike north of White Hills are turning out first rate as work on the properties progresses. There are 20 tons of concentrate from the C. O. D. mill at the Kingman depot, and Charles Lynch informs us there are 60 tons more at the mine awaiting transportation. P. R. Washington has struck

a big streak of 500-ounce silver ore on the Big Dick mine, near Eugene Camp, owned by himself and D. R. Beebe. The owners feel pretty good over the find. Ed. Phenix and Geo. Blaine have in several tons of rich ore from their lease just finished on the Prince Albert mine, Indian Secret district. They have now three men at work on the Miner's Dream and will make a big shipment from this property next month. The rich gold mines of Gold and Lost Basins are now coming to the front. Mining men are going there daily to look over its vast possibilities and invest their coin freely in its mines. With the better and cheaper facilities for the working of ores every mine in the two districts will be worked on a large scale. In the south drift of the Blake mine, south of town, a splendid showing in free-gold ore is being made. The ledge is increasing in width as drifting progresses. Judge L. O. Cowan and Sergeant J. L. Sullivan have gone to Needles and thence will proceed along the river range of mountains on a prospecting trip. The Gold Basin mill is running steadily on El Dorado ore and seems to be working it successfully. Supt. McLeish has about a dozen men at work on the mine and is opening it up in good shape and at the same time taking out enough ore to keep the mill pounding away steadily. The Happy Boy mine, situated at Eugene Camp, has been sold to J. W. Gross, of Chicago, for the sum of \$10,000. This property was owned by Tom Chidester, Ide Hamblin, Ed. Williams and Charles Merritt, and although very little development work has been done as yet, it is a fine looking prospect and is likely to prove a bonanza to its present owners. W. B. Thompson, of this place, has been instrumental in the consummation of the sale of the mine Baron de Lsgrang, of Denver, Colo., who has been examining the mines of White Hills, Gold and Lost Basins, went west on Tuesday night's train. In conversation with a Miner reporter he said that in no portion of the west (over which he had traveled extensively) has he seen such vast fields of minerals as in the county of Mohave. Chain on chain of mountains bearing precious metals paralleled each other over the entire breadth of the country and extending north and south within its border for 300 miles in length. The ores of gold, silver, copper and lead were far richer than in any other part of the great west and the time was now ripe for the influx of capital from the States and Territories where the mineral resources were fast becoming exhausted. The Baron will return shortly to old Mohave and will be the means of investing large sums of money in our mines.

ALASKA.

NOTES.—Alaska Journal, March 10: William T. Turner, who for the past seven years has held the responsible position as foreman of the mill at Treadwell's, will leave on this boat for an extended visit to his home at Sutter Creek, Cal. For some months past Mr. Turner has been unwell and goes below to recruit his health. It is the sincere wish of his host of friends here that he will soon return to us with renewed strength and vigor. Mr. Turner has been engaged in mining and milling ever since he was a lad of 17 years, and is considered authority on all matters pertaining to his business. The system now in operation at the Island is a striking example of his skill. We can ill afford to spare such men. Alaska needs them. Fred. D. Nowell, manager for the Newell Gold Mining Co., who has been spending the winter in San Francisco, will return to Alaska on the first steamer in April. The company is having a fine steam launch built by Earle & Engelbrecht, Lake Washington, which will ply the waters between here and Berner's bay. Wm. Brierly, who has been watchman for the Silver Queen Mining Co.'s properties in Sheep Creek Basin, will start for the Yukon on Monday. Mr. Brierly is an old "Yukoner," having been in twice before and is well posted regarding the country. A. Frank and E. Shumacher started for Sumdum last week to develop the property they own there with Messrs. Reid & Robbins. It is one of the best prospects in Alaska. Henry Mead will shortly leave for Berner's bay with several men to put up the Berner Mining Co.'s new mill.

BRITISH COLUMBIA.

MINING NEAR YALE.—Inland Sentinel, March 18: Mr. Geo. D. Rodney, of Yale, reports that he has just returned from Tacoma, where he sold a five-sixth interest in his claim on Siwash Creek, the Bonanza, to Messrs. John A. Parker, Geo. A. Libbey, Chris. Bertlesen, Bertel Bertlesen and Philip L. Reese. Mr. Rodney is one of the oldest miners in the Yale district, having had his present claim for 14 years. As soon as the snow disappears, work will be started up on his claim and will be carried on all the summer. While on his way back from Tacoma, Mr. Rodney stopped off at Whatcom, and saw some men there who own a claim next his, and was informed they intended to work the claim this year. Mr. C. T. Dunbar, of Vancouver, also has a claim near there, and he has been working most of the winter night and day with a big gang. The cold weather, however, considerably interfered with work, as the thermometer went down as low as 30 and clove on to 40 degrees below zero.

IDAHO.

GEM MINING.—De Lamar Nugget, March 18: The town of Opaline now has stage lines running into it from both Caldwell and Nampa. Mining for gems is being profitably pursued and the extent of the field in which they exist appears to be larger than it was at first supposed to be. The scarcity of water is one of the drawbacks to the camp which the claim owners will try to remedy by boring for artesian water. It is quite probable that water will be readily found, as the existence of mud springs in the vicinity and of warm springs lower down, indicate that there is a flow of water not far below

the surface. Many of the gems found are unquestionably fine and valuable. The industry of mining for them will, without doubt, become one of the important industries of the country.

THE ONLY PRODUCER.—Ketchum Keystone, March 18: The Last Chance is the only producing mine now being operated in the Atlanta and Rocky Ber regions. It is distinctly a gold mining proposition, carrying a very little silver, and is probably now the most valuable going gold venture in Central Idaho, if not in the whole State, and our enterprising townsman, Major Hyndman, is to be congratulated over his most promising gold prospects, notwithstanding the knock-out disaster to his Silver King efforts for the time being.

MONTANA.

SMELTER TO CLOSE.—Butte Inter-Mountain, March 18: In less than two months from date, the fires will be drawn at the lower works of the Boston & Montana Company in Meaderville, and, while that locality will still produce its quota of rich ore from the mines of the company, none of it will be treated here. The upper works long since abandoned its furnaces, and, as soon as the quantity of ore on hand is treated, the lower works will also close. The closing of this smelter will affect about 200 workmen, but it is more than likely that the most of the employees will be given work at the Great Falls smelter. The lower works are in excellent condition, and there is considerable speculation as to what the company will do with the valuable buildings and machinery. The hoists and small concentrating plant, formerly in use at the upper works, are now being removed to Great Falls, and it is probable that the machinery from the lower works will also be removed to the Cascade City. Owing to the decision of the company to suspend work at the lower works, work has also been suspended at the Moose, where about 30 men were employed during the past month. The ore produced from this property has been treated at the lower works, but it is not considered to be sufficiently high grade to warrant the expense of mining and shipping to Great Falls. While the same number of men is employed at the Leonard shaft, there were a few miners dropped at both the West Colusa and Harris & Lloyd during the past week. It is believed, however, that the lay-off was merely temporary, and that when everything is in shape at Great Falls, the largest force of men ever employed by this company will be occupied in digging from the earth its rich product. During the week mechanics have been engaged in laying the foundation for the large pump which will be placed at the 600-foot level of the Leonard shaft. This pump is a new departure in this class of machinery for underground work, and consists of an ordinary Corliss engine, with the piston attached to the plunger of the pump. It was built at Chicago under a German patent. The pumping machinery is built entirely of brass to withstand the effects of the acidulous water, which plays havoc with ordinary iron. The pump is a compound, condensing one, and is guaranteed to raise 900 gallons of water per minute 600 feet in height. Only about one-half this amount of water is now being pumped from the West Colusa, which drains the Leonard, so that the pump need not be forced to keep the mine of the company freed of water. The new smelter of the Montana Ore Producing Company, of which F. A. Heinze is the general manager, is working about 200 tons of crude ore per day. During the past week the new water-jacket blast furnace was started up, and, it is understood, gives good satisfaction. Most of the matte obtained from the furnaces will average 75 per cent pure copper. This matte is crushed and sacked at the smelter and shipped to New York. A great many improvements will be added to this smelter during the present year. The dangers from fire will be reduced to a minimum by the substitution of slag walls for the ordinary timber, and the insurance rates have already been reduced through an improvement by which water can be applied to any portion of the building in the least possible space of time. The ore from the smelter is obtained from the Gleggarry or Osmbers, the Gambetta, Speculator and Pacific, each of which carries a high percentage of copper and silver. Mr. Heinze also, during the past week, leased and bonded the Cora mine. The Cora is on the same vein as the Lexington, and was known at one time as one of the greatest producers of the district. At present the workmen employed by Mr. Heinze are engaged in pumping out the water, and, as soon as this work is completed, Mr. Heinze will actively push the work of development and demonstrate the value of the property. Many of the old miners of Butte believe that development work is all that is needed to prove the Cora equally as rich as its neighbor, the Lexington. The bond is said to be for the sum of \$200,000.

THE ALICE REPORT.—The annual report of the Alice Gold and Silver Mining Co. for the year ending December 31, 1892, was issued Wednesday in pamphlet form. President Walker states that the period covered by the report has been one of curtailment, as far as it was in the power of the company to do. It was not practicable to close down the mine and works, but the operations had been limited. The great discount on fine silver, which was the heaviest known in modern times, had caused the company to run behind to the extent of \$18,025.62. The average discount on the sales of silver in 1892 was 36.06 per cent from the old standard of \$1.2929 per fine ounce. The average product of ores has also fallen short in the gold and silver value of the same for the previous year. On account of curtailing at the mill, the bullion yield was only \$577,480.67, reckoned on the standard value of \$1.2929 per fine ounce. The discount on the silver was \$193,950.26, so that the total product in gold dollars was but \$378,530.41. The president says that, with silver at the present price, it is impossible for the

company to make money, and the results for the ensuing year will be limited by the price of silver on the market and the grade of ore obtained. During the year the company's mills produced 614 bars of Dore bullion, containing in gold, at \$20.67 per fine ounce, \$25,159.52, and in silver, at \$1.2929 per fine ounce, \$577,480.67. The mill is reported to be in excellent condition, and some development work has been done in the mines aggregating 3029 feet. In the Alice, new ground has been opened and the slopes there are the largest producers of sulphuretted ores in the mine. Supt. Hall says that much as he would like to see more development work done, he cannot urge it on account of the depression in silver. The loss in quicksilver was 11,165 pounds. The total number of hands employed at the mill and mines is 204.

THE GAMBETTA.—Messrs. Mullins, Doyle & Co. have a lease on the Gambetta and have worked this property continuously since last December. The lessees put up a bond of \$7500 for the faithful performance of their part of the contract in developing the mine. Shipments are being regularly made to Heinze's smelter. The ore averages 18 per cent copper and 15 ounces in silver to the ton.

THE SPECULATOR.—The Speculator, which was the subject of a great lawsuit over a year ago, is now under lease to Case & Co. This mine, if properly developed, is said to be one of the richest of the district. The lessees are extracting a large quantity of 23 per cent copper, which they ship to Heinze's smelter. At the Butte & Boston smelter there are eight O'Hara's, four matte and one blast furnace in operation, and the daily output exceeds 40 tons.

JEFFERSON COUNTY ORE.—Some very rich specimens of copper ore carrying gold and silver were received in Butte this week from Jefferson county. The property is situated about seven miles north of Three Forks, and as yet but little development has been done. The Electric lode has a shaft down 30 feet deep and the vein is about seven feet in width, well defined from the surface. The lode has only a six-foot shaft, but both veins carry fine oxide of copper and gold in paying quantities. Thorn & Co. own these prospects, which are being developed as fast as possible.

OREGON.

THE VIRTUE MINING CO.—Bedrock Democrat, March 12: Mr. Geo. W. Borman returned yesterday from Portland and shortly after his arrival proceeded forthwith to the Virtue mine. At a meeting of the stockholders of the Virtue Mining Co., held in Portland a few days ago, Mr. Borman was elected to the position of manager and superintendent of the company. At the meeting of stockholders held while he was in Portland the affairs of the company were so arranged as to place future operations on a sound footing, and there was every assurance that the operation of the Virtue would be a success. The stockholders are greatly encouraged with the bright prospects ahead, and have placed sufficient money in the treasury to meet all requirements. Mr. Borman brings home with him the amount necessary to cancel the payroll. Mr. David Ogilvy, president of the company, and Mr. N. S. Wight will arrive from Portland to-day. The \$4000 gold brick taken to Portland a few days ago and exposed to the optics of the webfooters created quite a stir in mining circles, and great interest was expressed in the mines of Beker county.

UTAH.

THE MAMMOTH MEETING.—Salt Lake Mining Exchange, Mar. 16: The annual meeting of the Mammoth Mining Company, at which 237,057 shares were represented, was held yesterday afternoon in the office of Bennett, Marshall & Bradley, and the old board, with slight changes, was re-elected. Following are the directors: Wm. McIntyre, H. P. Mason, J. A. Cunningham, Wm. M. Bradley, F. E. Goodhart, W. S. McCormick and L. S. Hills. Wm. McIntyre was elected president; J. A. Cunningham, vice-president; L. S. Hills, treasurer; and J. Fred Corker, secretary. The matter of the appointment of a superintendent was left with the board, with the understanding that, if they could agree with G. H. Robinson, of the Drum Lummon mine, of Montana, as to terms, etc., he should be employed. The proposition of Mr. Goodhart, one of the heavy English stockholders, to the effect that the amount now in the treasury, and the proceeds from the ores now in sight in the mine, should be applied to the erection of a mill for the reduction of their low-grade ores, and that no dividends should be paid until the necessary funds for its erection had been realized from the mine, was unanimously adopted by the stockholders. The mill will have 40 stamps, and it will cost something like \$125,000. This includes the building of a separate pipe-line to the company's springs in Death canyon, a distance of about 15 miles. The water will be pumped up about a thousand feet at the springs, when it will run to the mill by gravitation. One of the directors, when asked when work would be resumed at the mine, said probably not until the company could get miners to work at \$2.50 per day.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business in this country for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SOLICITING FIRM Patent Agency (S. F.) from week to week and year to year.

Market Reports.

The Markets.

SAN FRANCISCO, March 23, 1893.

Fine silver sold in New York yesterday at 81 1/2 per ounce for the pure article 1000 fine. There were also sales in London at 37 1/2-66 per ounce, 925 fine. These quotations are a fraction lower than Tuesday, and the lowest prices at which the metal has sold during the present currency. Silver at 37 1/2 per ounce in London, which is practically the figure there to-day, is equivalent to 82 1/2 for the pure article, 76c for .925 fine, the English standard, 74c for .900 fine, the United States Mint standard, and 63 1/2 for the 412 1/2-grain dollar, which is now being turned out from the American mints. The cause of the present weakness is probably the completion of the Government purchases for the month, coupled with the impression that other countries are going to let the United States work out the problem of maintaining a parity between the metals alone. The established parity under which the coin is now being turned out means 59d per ounce. The present price shows a heavy discount on the parity price.

Several friends of silver coinage in the Senate claim to have positive assurances from President Cleveland that he will send a delegation to Brussels in May to represent the United States at the International Monetary Conference, and that he has already taken steps to notify the various nations taking part that our Government would be pleased to have them again represented. Allison and Teller are reported to have received these assurances.

It is not improbable that Teller will take the place of Jones of Nevada, as the representative of free-silver Republicans on the delegation from this country. Allison has refused positively to return to Brussels and Jones does not desire to go. The President will designate a Democrat in accordance with his views on the silver question to take the place of Allison. Among the names suggested as the possible choice are J. Edward Simmons, a prominent New York banker; ex-Comptroller W. L. Trenholm, and ex-Secretary Fairchild.

QUICKSILVER.—Of late there has been a larger movement in quicksilver. The shipment of 280 flasks to Prescott, Ont., recently was notable in adding another destination to the export list. New York has taken 1000 flasks so far for this month and Mexico 375. These quantities are exclusive of whatever shipments have been made out of the State by rail.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	@ 14	English, do.	@ 18
BORAX.		Canton tool.	
Refined, in cts.	@ 7 1/2	14x20, do.	@ 15
Powdered, do.	@ 7 1/2	14x20, do.	@ 15
Concentrated, do.	@ 6 1/2	14x20, do.	@ 15
All grades jobbing at advance.		14x20, do.	@ 15
COPPER.		TIN.	
Bolt.	@ 22	B. V. steel grade.	@ 5 3/4
Sheeting.	@ 22	14x20, spot.	@ 5 3/4
Ingot, jobbing.	@ 14	14x20, do.	@ 5 3/4
Do, wholesale.	@ 13 1/2	Do, do.	@ 5 3/4
Fire Box Sheet.	@ 24	Do, do.	@ 5 3/4
IRON.		PIG IRON.	
Bar, base.	@ 3	Spot from yard-per ton.	@ 24
Nurway, base.	@ 4 1/2	Wellington.	@ 88 00
Spot from yard-per ton.		Greta.	@ 7 50
Eglington.	@ 20 00	Nauaimo.	@ 6 50
Glenbrook.	@ 20 00	Climan.	@ 6 50
Am. Soft, No. 1.	@ 22 00	Seattle.	@ 6 50
Oregon Pig.	@ 20 00	Oose Bay.	@ 5 50
Puget Sound.	@ 20 00	Canuel.	@ 8 50
Clay Lane White.	@ 22 00	Egg, hard.	@ 12 00
Langdon.	@ 22 50	Oumberland, in sacks.	@ 16 00
Thorncliffe.	@ 23 00	Do, bulk.	@ 14 00
Carabrie.	@ 22 50	Walsend.	@ 7 25
Barrow.	@ 22 50	Scotch Spint.	@ 7 50
Ovensteel.	@ 22 00	Brynabo.	@ 7 50
CHROME IRON ORE.		West Hartley.	@ 8 00
Perton.	@ 20 00	TO LEAD.	
LEAD.		Australas.	@ 37 00
Pig.	@ 4 1/2	Liverpool Steam.	@ 50 00
Bar.	@ 5 1/2	Scotch Spint.	@ 00 00
Sheet.	@ 7 1/2	Do.	@ 00 00
Pipe.	@ 6 1/2	Lehigh Lump.	@ 11 00
SHOT.		Oumberland.	@ 12 00
Drops, sizes smaller than		Egg, hard.	@ 10 00
B. & C. of 25 lbs.	@ 1 80	West Hartley.	@ 50 00
Do, do. of 35 lbs.	@ 2 00	COKE.	
Brook, Balls and "filled		English, to load.	@ 39 50
do, of bag of 25 lbs.	@ 2 00	Do, spot, in bulk.	@ 40 00
QUICKSILVER.		Do, in sacks.	@ 41 50
Home trade, pr.	@ 41 50	Oumberland.	@ 50 00
For export.	@ 42 00		

Eastern Silver Markets.

NEW YORK, March 23.—Following are the closing prices for the week:

Silver in—		London.		N. Y. Copper.		Lead.		Tin.	
Thursday.	38 1/2	83	11 70	33 95	24 10				
Friday.	38 1/2	83	11 70	4 00	21 20				
Saturday.	38 1/2	83	11 70	4 00	21 10				
Monday.	38 1/2	82 1/2	11 70 1/2	4 00	21 20				
Tuesday.	38 1/2	82	11 70	4 00	21 15				
Wednesday.	38 1/2	81 1/2	11 70	4 02 1/2	21 10				

Mining Share Market.

Business has been a little better this week than last in mining-stock circles, but transactions have not been large. Quite a number of assessments have been levied of late on Comstock mines, but the amounts are smaller than has been customary. It is probable the directors think they will be more apt to collect the whole amount if a small assessment is made, than if 25 to 50 cents a share is called for. Many of the companies lately have had hard work to collect their assessments, and have had to take in the stock themselves when delinquent.

Thomas T. Atkinson of the San Francisco Board has proposed an amendment to the by-laws of the exchange, whereby transactions in stocks selling at 50 cents or less can be traded in on a difference of 50 cents per share. Even considering a proposition of this kind shows what little there is left in the business.

A large number of recently discharged miners from the Comstock mines are in this city and are daily seen in Pine street and Pauper alley.

It is currently reported that Harry M. Gorbam is to manage the new bank which Hon. J. P. Jones is to start at Santa Monica.

Judge Sanderson's decision that a seat in a Board is not subject to taxation is very pleasing to the brokers, although some of them have already paid the tax for the past year. The Supreme Court will have to decide upon the matter.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from advertisements in the Mining and Scientific Press and other S. F. Journals.

COMPANY AND LOCATION.		No. AMT.		SECRETARY.	
Halbridge Placer & Gold M Co, California.		1.	4c.	Jan 28, March 8, April 5.	R George, 419 California
Belcher M Co, Nevada.		45.	50c.	Feb 8, March 14, April 4.	C L Perkins, Mills Building
Bodie Cons M Co, California.		15.	25c.	Feb 13, March 20, April 17.	H D Walker, 309 Montgomery
Brunswick Cons M Co, California.		8.	2c.	Feb 23, March 28, April 15.	J Stedfield, 309 Montgomery
Challenge Cons M Co, Nevada.		14.	25c.	Feb 11, March 16, April 6.	C L McCoy, Mills Building
Cons Imperial M Co, Nevada.		35.	30c.	March 29, April 26, May 17.	C L McCoy, Mills Building
Cons St. Gotthard U M Co, California.		7.	25c.	Feb 9, March 11, May 6.	T Wetzel, 330 Sansome
Crown Point M Co, Nevada.		30.	1c.	Feb 23, March 21, April 20.	J Newlands, Mills Bldg
Debris M Co, Cal.		3.	1c.	March 8, April 12, May 3.	C F Hunt, 14 Sansome
Kollipie M Co.		3.	2c.	Feb 10, March 17, April 7.	O Tum Soden, 216 Bush
El Leopoldo M Co, Mexico.		2.	2c.	Jan 24, March 3, March 28.	J Howes, 214 Pine
Fall River Cons M Co, California.		10.	2c.	Feb 3, March 2, April 11.	A Lorbach, 313 Front
Galena M Co, Cal.		2.	5c.	March 9, April 27, May 18.	D M Kent, 330 Pine
Independence M Co, Nevada.		18.	5c.	Jan 27, March 6, March 26.	J W Pew, 310 Pine
Manzanita Gravel Co, California.		1.	2c.	Feb 1, Mar 15, April 5.	R J Shumway, Nevada City
Mexican M Co, Nevada.		47.	25c.	March 18, April 20, May 11.	D M Kent, 330 Pine
Monas M Co, California.		33.	25c.	Feb 20, March 27, April 21.	H D Walker, 309 Montgomery
Monas M Co, California.		16.	10c.	Jan 28, March 6, March 30.	C O Bresse, 230 Montgomery
North Belle Isle M Co, Nevada.		22.	10c.	Jan 26, March 3, April 3.	J W Pew, 310 Pine
North C. commonwealth M Co, Nevada.		4.	10c.	Jan 20, March 2, March 30.	J W Pew, 310 Pine
Occidental M Co, Nevada.		12.	15c.	March 17, April 20, May 11.	A K Parker, 309 Montgomery
Opit M Co, Nevada.		50.	5c.	Feb 15, March 20, April 5.	E B Holmes, 309 Montgomery
Savage M Co, Nevada.		80.	5c.	March 16, April 19, May 9.	E B Holmes, 309 Montgomery
Sierra Nevada M Co, Nev.		14.	25c.	March 9, April 12, May 1.	E L Parker, 309 Montgomery
Silver Hill M Co, Nevada.		32.	5c.	Feb 14, March 21, April 11.	D C Bates, 309 Montgomery
Superior M & M Co, California.		10.	10c.	Feb 15, March 20, April 5.	I N Willard, 327 Front
Teresa M Co, Nevada.		10.	10c.	Feb 24, April 1, April 19.	K J Willard, 309 Montgomery
Union Cons M Co, Nevada.		47.	25c.	March 16, April 21, May 11.	C C Harvey, 303 California
Yellow Jacket M Co, Nev.		54.	25c.	March 10, April 14, May 19.	W H Blauvelt, Gold Hill
MEETINGS.		MEETING.		SECRETARY AND OFFICE IN S. F.	
Champion M Co, California.		Annual.		T Wetzel 330 Sansome.	April 11
Osmunda Lead Works, Utah.		Annual.		J M Quay, 124 Sansome.	April 5
Jackson M Co.		Annual.		O R Jones, 230 Pine.	March 27
Phoenix M Co.		Annual.		J Boie, 615 Sansome.	April 3
DIVIDENDS.		AMOUNT.		SECRETARY AND OFFICE IN S. F.	
Bulwer Cons M Co, California.		5.	10c.	L Caborn, 309 Montgomery.	Oct 20
Champion M Co, California.		10.	10c.	T Wetzel, 310 Pine.	Dec 19
Cons New York M Co, Nevada.		10.	10c.	E Elliott, 309 Montgomery.	Feb 15
Great Western Quicksilver M Co.		25.	25c.	Halsey, 328 Montgomery.	Oct 8
Humboldt Gravel M Co, Cal.		25.	25c.	D M Kent, 330 Pine.	Dec 20
Pacific Coast Borax Co, California.		100.	10c.	A H Clough, 230 Montgomery.	Jan 10
Standard Cons M Co, California.		10.	10c.	J W Pew, 310 Pine.	Dec 23

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

- FOR WEEK ENDING MARCH 14, 1893.
- 493,239.—WATER-WHEEL—S. L. Berry, S. F.
- 493,542.—DISPLAY SHELF, ETC.—Bessing & Barker, Los Angeles, Cal.
- 493,617.—VENDING MACHINE—J. W. Crites, Sacramento, Cal.
- 493,402.—CAR-COUPLING—C. W. Hinton, Los Angeles, Cal.
- 493,503.—GUIDE SHIELD FOR TYPE-WRITING MACHINES—Rebecca E. Hooper, S. F.
- 493,271.—COPYING PRESS—H. M. Hoyt, Spokane, Wash.
- 493,583.—CAN BODY-FORMING MACHINE—R. D. Hume, Gold Beach, Ogn.
- 493,593.—STUMP-EXTRACTOR — B. Mattress, Scribner, Cal.
- 493,283.—NAUTICAL SIGNAL — McGregor & Perry, Centralia, Wash.
- 493,340.—MOP-WRINGER—Mary E. Prescott, S. F.
- 493,525.—CAP-MAKING MACHINE—H. Schaake, S. F.
- 493,305.—BED CANOPY-FRAME—W. N. Sherman, Merced, Cal.
- 493,382.—FLOW-SHOVEL—J. F. Schultz, San Jacinto, Cal.
- 493,307.—HAY-LOADER—T. J. Snyder, Wallowa, Ogn.
- 493,566.—SETTING-GAGE FOR DOOR FRAMES—R. Steedman, Berkeley, Cal.
- 493,315.—STENOLOGON ON TRANSPARENT MATERIAL—G. H. Tietzen, S. F.
- 493,605.—BRACKET TABLE-SUPPORT — J. N. Tiffany, San Diego, Cal.
- 493,316.—HOSE-COUPPLINGS—E. L. Townsend, Los Angeles, Cal.
- 493,345.—FIRE-LADDER—J. M. Wallace, Portland, Ogn.

The following brief list by telegraph, for Mar. 21, will appear more complete on receipt of mail advices:

California—Anthony Fereva, Nelson, Self-cleaning screen; Andrew Gamble, Nordhoff, almond or walnut filler; Elsiea Hayes, Sacramento, metallo lathing; Harry M. Little, Rivera, cultivator; John C. Lock, San Jose, two patents for car couplings; John McMullen, H. Krusi and H. S. Wood, San Francisco, canal digger; Dennis O'Leary, Winchester, lid-holder; Theodore A. Schluter, Oakland, oil can or other liquid receptacle; William H. Vance, San Francisco, folding grate front and hearth.

Oregon—John J. Burko, Roseburg, railway cattle guard; Edward N. Gannon, assignor to himself and J. G. Hewison, Portland, two patents for a funnel; Ira L. Martin, Amity, feed box.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, March 23, 1893.

9:30 A. M. SESSION.

100 Alpha.	10c	200 Gould & Curry.	75c
50 Alta.	15c	300 Mexican.	1.45
100 Belcher.	85c	500 Hale & Norcross.	1.00
650 Best & B.	1.50	300 Mexican.	1.45
50.	1.45	500 Potomac.	1.70
800 Bullion.	5c	800 Savage.	70c
100 Bulwer.	25c	700.	55c
100 Challenge.	35c	1000 Union.	8c
300 Chollar.	7c	200 Union.	8c
370 Con. Cal. & Va.	2.35	100.	85c
200 Crown Point.	35c	100 Yellow Jacket.	35c
200 Exchequer.	15c	50.	40c

2:30 P. M. SESSION.

100 Andes.	40c	200.	1.05
400 Belcher.	85c	300 Mexican.	1.45
300 Best & B.	1.40	25.	1.35
200 Bullion.	5c	850 Savage.	55c
300 Bulwer.	25c	200 Potomac.	1.70
100 Challenge.	35c	100.	55c
100 Chollar.	7c	1500 Sierra Nevada.	1.65
500 Con. Cal. & Va.	2.30	100 Union.	75c
500 Crown Point.	30c	100 Yellow Jacket.	35c
500 Hale & Norcross.	1.00		

Assessment Notices.

SUPERIOR MILL AND MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Placerville, El Dorado County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 15th day of February 1893, an assessment (No. 1) of five cents (5c) per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, Room 2, No. 323 Front St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 20th day of March, 1893, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on Wednesday, the 6th day of April, 1893, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
I. N. WITRUGH, Secretary pro tem.
Office, Room 2, No. 323 Front St., San Francisco, Cal.

POSTPONEMENT.

At a meeting of the Board of Directors of the Superior Mill and Mining Company held on the 23rd day of February, 1893, the day of delinquency in the above assessment was postponed to April 3d, 1893, and the day of sale to MONDAY, April 24th, 1893, at the same hour and place.

BOOKS ON ASSAYING.

By C. H. AARON.

Part I.—Gold and Silver Ores.

SECOND EDITION—PRICE \$1.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements: Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Lignite; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Lead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 130 12mo. pages, with illustrations well bound in cloth; 1893. Price, \$1, postpaid. Sold by DEWEY PUBLISHING CO., Publishers, No. 220 Market Street, San Francisco.

Parts II and III.

Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Etc.

SECOND EDITION—JUST OUT.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Olay Lucas's Method; Volhard's Method; Manipulation; Lead Ores; Copper Ores; Tin Ores; Mercury Ores; Zinc Ores; Nickel and Cobalt; Chromium; Bismuth; Arsenic; Antimony; Sulphur; Salt; Note.

One of the methods given for the Assay of Copper is new, original and exact, as is also one of the processes for Zinc.

The book contains 151 pages with illustrations, and is strongly bound in cloth. Much of the original text is replaced by new matter.

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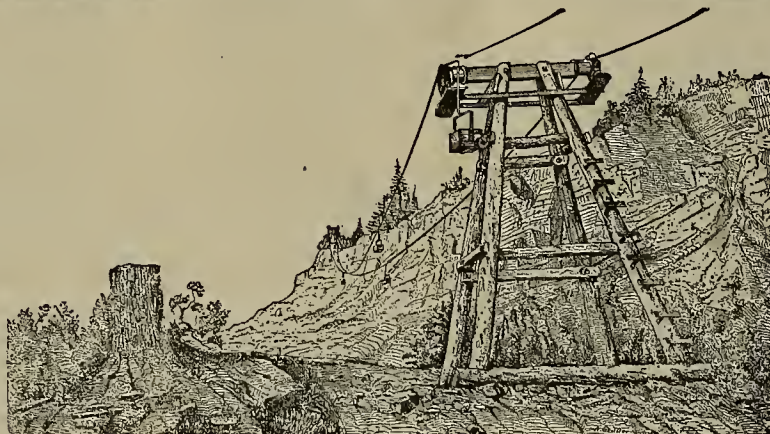
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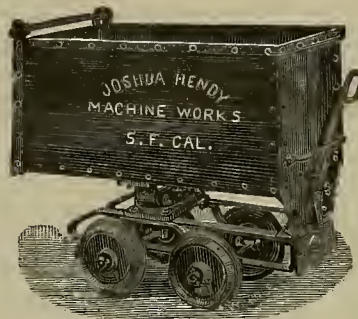
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SAN FRANCISCO, SATURDAY, APRIL 1, 1893.

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A New Electric Vapor Motor.

In the early part of last year we illustrated a gas or gasoline engine used for motive power (the invention of Daniel Best of San Leandro, California,) which has been used in hauling street cars from San Jose out towards Alum Rock, about eight miles, and which is still in use on that suburban road. We herewith give an engraving of one of the latest inventions of Mr. Best which has been named an electric vapor motor.

This motor was built to run on a street railway line between Yuba City and Marysville, California, a distance of four miles. After its completion a number of newspaper reporters visited San Leandro to witness its work on a short line of railway built for experimental work. An hour of severe trial under the exacting conditions proved its capacity and adaptability for street railway service. This motor will gain a high rate of speed within a very short distance and can be checked within a few feet. The motor is enclosed in a car and when the doors of the car are closed little or no noise can be heard ten feet away. An admirable feature of this motor is the system by which it can be thrown in and out of gear without causing a jerk or jar. The expense of this motor in running is small. In comparison with horse power, electricity, cable or steam power it is claimed by the inventor that it does not on an average cost one-third as much as the cheapest of these. It is easily handled by one person and its simplicity of construction makes it inexpensive to keep in repair.

The mechanical features, which are shown in the engraving, are covered by several patents. The connecting rods from the pistons are attached to cranks on the main engine shaft and this shaft connects direct with the forward car-wheel axle by an endless steel roller-chain, passing around sprocket wheels on the shaft and axle. Another chain passes around a sprocket upon the rear axle and a sprocket upon a counter-shaft, driven by an intermediate gear from the main engine shaft, and by means of a clutch mechanism, one set of wheels may be driven directly from the engine shaft to propel the car in one direction, while the others are disengaged from the shaft and run free. By changing the clutch the first set is thrown out of gear, and the others are engaged so that the car will be driven in the opposite direction. The number of revolutions of the engine per minute is 200, and of the

car-wheels (diameter 30 inches) is 100; this giving a speed of eight miles per hour. This speed can be changed by the operator from 75 to 250 revolutions per minute.

The speed of the engine is controlled by a simple ball governor that governs the amount of gas required, as well

exhaust from the engine may discharge beneath the car, or, preferably, through pipes above the top of the car, so that no odor is discernible by the passengers. The inlet and exhaust valves are separately actuated, the exhaust being controlled by the governor, which acts directly upon

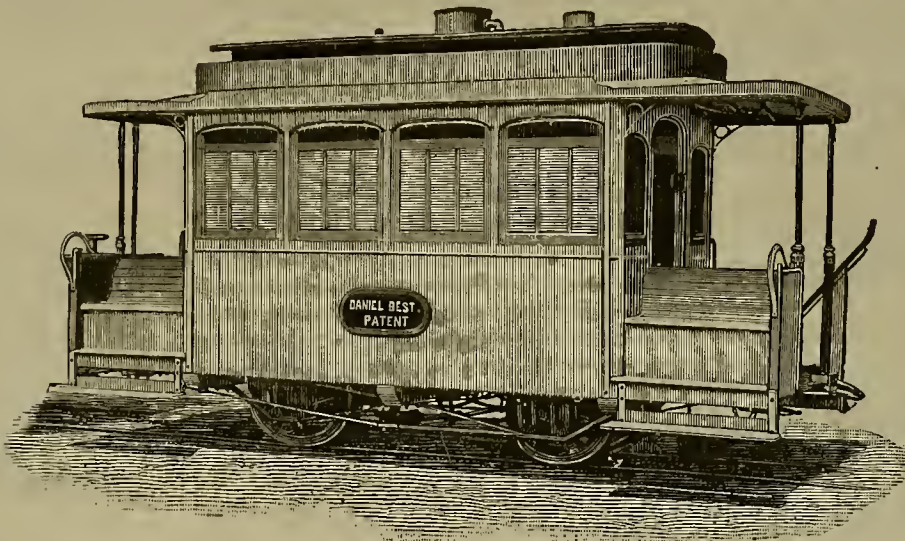
that instead of the inlet valve. Last week this motor was shipped to Marysville, where its capacity and adaptability was fully tested. Its advent was hailed with joy, and the local papers have long, commendatory articles on its efficiency in pulling a large trailer loaded with passengers, on short curves and heavy grades, without diminution of speed. The local endorsement was universal as to its excellence and capability, and several more motors will be immediately built for this road.

The question of rapid transit on street or suburban roads is a very important one, which is attracting the attention of inventors. High rates of speed on this class of roads must, however, be coupled with the element of safety to passengers, and the cars must be under control as to quick starting and sudden stopping. This is a feature to which Mr. Best has given special attention, and in which he has been successful. Cheap and efficient motors for outside street, suburban and country railroads will make a decided change in existing conditions. The crowded portions of cities will be relieved, since accommodations can be given further from the centers and yet there will be convenience of access. In the country regions speed may be attained and the roads be built and operated at less cost than by steam or electricity, in which systems expensive plants are required. These electric vapor motors are specially adapted for suburban roads, owing to their economy and efficiency.

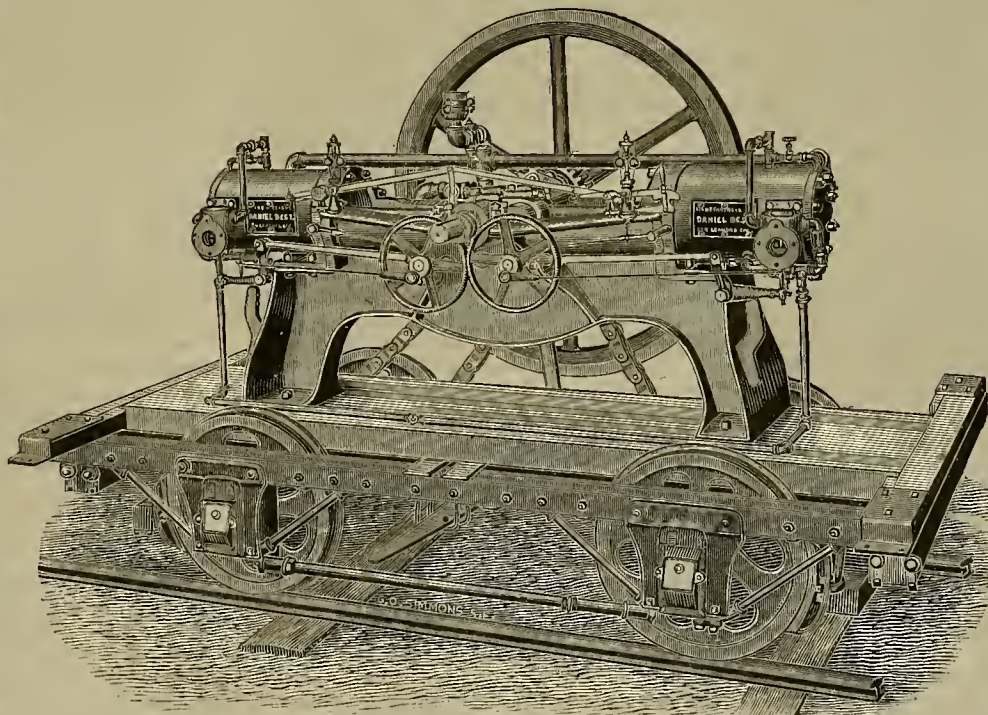
THE Government Commission to take action under the Caminetti law has been appointed. The U. S. Engineers selected are Col. Mendell, Lieut.-Col. Benyard and Major Heuer, all residents of San Francisco, and familiar with

this subject. Major Heuer and Col. Benyard were both members of the Debris Commission which reported to Congress on hydraulic mining in California, and it was on the basis of that report that the Miners' Association was organized and the Caminetti law enacted.

REPORTS have been received of new placer diggings in the southwestern part of Maricopa county, Arizona, about 30 miles north of Agua Caliente. Water is scarce.



BEST'S MOTOR AND CAR.



BEST'S ELECTRIC VAPOR MOTOR.

as governing the igniting device. This motor is operated from either end, it not being necessary to turn to run in an opposite direction. It can back or forward, stop or start, at the will of the operator. Either set of driving wheels can be brought into action by a simple movement of the reverse lever. The engine is double, as shown by the engraving. The gasoline is carried in a tank concealed in the roof of the car and brought down by pipes to the generator, and from thence to the engines as needed. The

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Meadow Lake Ores.

"Dan de Quille" recently published a letter in the *Engineering and Mining Journal* recounting the difficulties met with in treating the auriferous veinstone of Meadow Lake district, Nevada county. In an editorial referring to the letter the *Journal* says the specimens submitted appear to be a silicious hematite—and suggests, that a large percentage of the gold in that and the sulphurets might, be extracted by barrel chlorination, if an oxidizing agent such as nitre cake, is used.

In those portions of the different fissure occupied by auriferous veinstone in the Meadow Lake district, the gangue besides the quartz, consists of a large proportion of iron pyrites, and sphalerite (zinc blende) and some arsenical pyrites. The pyrites when exposed to the atmosphere, on the different croppings, became decomposed, and the melting of the snow carried away the decomposition leaving the free gold in the quartz, the assays from which gave such deceptive results.

When the vein-matter was sunk upon to a depth of some thirty or forty feet the undecomposed iron pyrites and zinc blende was met with again—the zinc blende rendering chlorination even in barrels a difficult matter. At one time seven mills were erected, and some 30 different processes tried. The great trouble, however, was the small proportion of gold in the vein-matter. One of our old correspondents remarked "That the big town was built up by high assays and let down by working results."

The *Journal* intimates, because we have failed to make a success with Meadow Lake ores, that California is behind the rest of the world in metallurgical methods: that we know nothing of the "barrel process" which is achieving such great results. As California happens to hold the record for cheap working of gold ores, the criticism amounts to little. Moreover, we do know of the barrel process, but know also that neither this nor any other process can make barren rock yield gold. The real difficulty with Meadow Lake ores is the fact that they do not contain the amount of gold reported. Experienced metallurgists have very carefully examined the whole district and its ores. The place has been abandoned for years. Old man Hartley, the last to stay, and who spent many dreary winters there, is dead; and this winter for the first time in 25 years there was not an inhabitant in Meadow Lake. That Californians are pretty good gold miners is attested by the fact that they are in demand all over the world and may be found in charge of the principal gold mines, wherever gold mining is carried on. Of course there is some gold in Meadow Lake ores, but the proportion is so small it will not pay to work them by any means as present known. If the "barrel process" people can make a success with these ores it would pay them to make the trial, for the mines in the present condition are of no value

whatever. But the California men are not going to the expense of any further experiments in this direction; that will be left to the owners of the patented process.

The Hydraulic Mining Laws.

The miners throughout the State are jubilant because Governor Markham has signed all the bills which are favorable to the mining industry. The Ford Hydraulic Mining bill, the Debris Commission bill and the Mining Bureau bill are now laws. On the first of these bills there was much discussion and opposition. After it was passed the Anti-Debris Association made a bitter fight before the Governor to have it vetoed. The Miners' Association, however, sent committees and the Governor heard the arguments of both sides. The result was that he signed the bill and it is now the law of the State. This is considered the most important of the laws passed at this session of the legislature as far as mining is concerned. It is very brief and is as follows:

SEC. 1424: This business of hydraulic mining may be carried on within the State of California wherever and whenever the same can be carried on without material injury to the navigable streams, or the lands adjacent thereto.

SEC. 1425: Hydraulic mining, within the meaning of this title, is mining by means of the application of water, under pressure through a nozzle against a natural bank.

This, as well as the Debris Commission bill was introduced in the Senate by Senator Tirey L. Ford, of Sierra, Plumas and Nevada counties and Mr. R. I. Thomas of Nevada county introduced them in the Assembly. In order that the miners of the State should have a clear understanding of the effect of these bills upon their industry the editor of the MINING AND SCIENTIFIC PRESS has interviewed Senator Ford and his statements are here appended:

"What effect do you think the legislation during this session of the legislature, and especially these two laws of yours, Mr. Ford, will have on the hydraulic mining in this State?"

"Senate bill No. 150, defines the conditions under which hydraulic mining may be conducted. The purpose of this bill was to embody in our civil code the principle that had been established concerning the business of hydraulic mining by our State and Federal courts. As you will remember, the latest expression of judicial opinion on this subject was the decision of the U. S. Circuit Court in October last in the case of the United States against the North Bloomfield Mining Co. The U. S. Circuit Court in that case, after hearing the evidence and the argument, and a personal inspection of the premises by the justice of the court, decided that mining by the hydraulic process could be prosecuted by this company and refused to issue an injunction. The practical effect of that decision was to dissolve a former injunction that had been issued by Judge Sawyer. This former injunction was the result of the famous suit known as Woodruff vs. North Bloomfield Mining Co. This last-named suit is the one upon which is based the main reliance of the Anti-Debris Association, and in all their discussions they quote from Judge Sawyer's opinion in that case and make it the basis of their arguments. The decision of last October by the same court, in a case where the same company was defendant, without overruling the decision of Judge Sawyer, did lay down the rule that not only could hydraulic mining be carried on without material injury to navigable streams and adjacent lands, but that, in fact, one of the largest hydraulic mines in the State of California had actually constructed such restraining works as enabled this very result to be accomplished. The justice who rendered the opinion stated (and this opinion can be readily obtained) that although the water leaving the restraining works was discolored and contained fine particles of comminuted clay, it did not contain or carry any such material as would be deposited in a navigable stream or anywhere when carried by water traveling at the rate of a mile in two hours, and that such material as was carried in suspension in water leaving this mine would be carried through San Francisco Bay to the Pacific Ocean. Senate bill No. 50 contains the principle of this decision boiled down and crystallized into a code section."

"Was there anything in the code prior to this prohibiting hydraulic mining?"

"No, the codes, heretofore, have contained nothing with reference to hydraulic mining. The whole law concerning the business of hydraulic mining was embodied in numerous decisions of the State and Federal Courts, and our State being a Code State and it being the policy of our State to embody all well-known legal principles in our code, and the law governing hydraulic mining having at last become settled by the courts, it was deemed advisable to enact into a code section the principles thus established."

"It will be readily seen that this legislation is very conservative in character. It gives the miner no rights beyond those given him by the decision of the U. S. Circuit Court last October in the North Bloomfield case, but it does

definitely determine the conditions that may be imposed upon the hydraulic miner, the rule of evidence that must govern in cases involving this industry, and puts the law into a definite and fixed form and in a code section where all may read and understand it. It places the business of hydraulic mining among the legitimate industries of our State, where it rightfully belongs and, it is hoped, will tend to put an end to the controversies that have heretofore been detrimental to both mountain and valley interests.

"I might add here that the apparent fear of some of the valley people that this provision may encourage the illegal prosecution of hydraulic mining is wholly without any reasonable foundation. The very law itself prohibits, in effect, any hydraulic mining except such as can be carried on in compliance with its terms, and, as every lawyer in the State of California knows, the code provision is strictly in line with the judicial rulings of our State and Federal courts. Curvalley neighbors must give the miners of this State credit for possessing at least a fair amount of intelligence, and their former obedience to laws that wrought havoc and ruin in their midst is a sufficient guaranty that they will abide by the conditions imposed by this, or any other, legal enactment.

"A definition of hydraulic mining was made necessary by the terms of the so-called 'Caminetti Law.' That act provided that the term 'hydraulic mining' should have the definition given to it in the State of California. That portion of Senate Bill No. 50 defining hydraulic mining meets the requirements of the 'Caminetti Law' in this respect."

"What is your opinion, Mr. Ford, in relation to the bill providing for the Debris Commission?"

"That bill, known as Senate Bill No. 389, is wholly and strictly supplemental to the 'Caminetti Act.' It provides that the Governor shall, on or before the first of next January, appoint a Debris Commissioner. This Debris Commissioner has authority to appoint a secretary. The bill further appropriates \$250,000 to be used in the construction of restraining works for the purpose of restraining mining debris. This appropriation, however, does not become available until Congress shall have appropriated at least as much for the same purpose. But when Congress does appropriate that amount, and as much more as it pleases, then this appropriation will become available and must be expended under the direction of this Debris Commissioner. All expenditures under this act are to be subject to the approval of the State Board of Examiners. The intention of the act is to enable California to co-operate with the general government in the construction of works necessary to permit hydraulic mining to be carried on under restrictions and limitations imposed by law."

"Mr. Ford, do you not think, in view of the passage of these laws, both in Congress and in the State Legislature, that the conditions are much more favorable for hydraulic mining than they have been since the original North Bloomfield decision?"

"There is not the least doubt of it. By this legislation both the State of California and the General Government are committed to a policy which cannot result otherwise than beneficially to the business of hydraulic mining. California has said that she will give \$250,000 to aid in the rehabilitation of this industry, provided that the General Government will give at least as much. California has now, through her Legislature, named the conditions upon which hydraulic mining may be resumed, and has shown her willingness to assist hydraulic miners in making it possible for them to comply with these conditions. The General Government, while it has not as yet gone as far as California in this direction, has started out by recognizing the industry and providing legal machinery whereby it may be resumed. The only thing involved now is for the Federal Government to meet the invitation of California and appropriate a sufficient sum of money to construct the required works to enable this industry to be resumed. I should say that the outlook is particularly encouraging. True, our miners must be yet a little patient. They must not for a moment imagine that enterprises of this nature and work of this magnitude can be accomplished in a day. We have gone a long distance in the right direction, and, if the miners are united, firm and persistent, they will get what they are entitled to. There is one imperative necessity. The miners must keep up their organization. Through the State Miners' Association and its branches, they have accomplished what has been done by way of legislation in both Congress and the State Legislature. Too much praise cannot be bestowed upon that organization, its executive committee and its officers. I should like to name personally some members of that association who have done heroic work for the miners, but it is hardly proper for me to do so on this occasion. Suffice it to say that in the Miners' Association, in its prosperity and in its success, lies the success of the cause of the miners. For years the miners have been fighting single-handed and individually against powerful organiza-

tions composed of the best men of the valleys, backed by abundance of means and the best counsel they could employ. Now, for the first time in the history of California, the miners have an organization officered by some of the best men of our State, the result of whose work has been such legislative fruit as two years ago was not dreamed of by the wildest mining enthusiast. I wish all of the miners in California could thoroughly appreciate the good work done by their association and the necessity for their continuous and enthusiastic support of it."

Refrigerating Machinery.

The Vulcan Iron Works shipped this week to the Gambrinus Brewing Co., of Portland, Or., a 35-ton Vulcan horizontal refrigerating machine, the first of this design built on this coast. It is driven by a "Vulcan" Corliss engine. The machine is double-acting, compressing at each end of the stroke. These horizontal machines are preferred by many to the vertical type, as there is no necessity for a platform, and the attendant does not have to climb to get at the valves, engines, etc. The Vulcan people have taken special trouble to provide ingenious methods for circulating cool oil through the stuffing-box to prevent heating of the piston-rod. The ammonia cylinder is completely jacketed to provide water circulation. This new design is particularly adapted for the larger sizes of refrigerating machinery. Everything about the machinery is strong and substantial to stand the high pressures necessary. The whole plant, as far as machinery is concerned, was designed and built in this city.

The Vulcan Iron Works are putting a cold-storage room in the steamship Umatilla for the benefit of all shippers needing cold-storage accommodation. They are also making a plant for the Castle Crag hotel, Shasta county. Another plant is being built for the Syndicate Breweries at San Diego.

The refrigerating business is getting to be quite an industry on this coast. There is, in many lines, an increasing demand for refrigerating plants and ice machines. The Vulcan works are making a specialty of this class of machinery and extending their business in it all over the Pacific slope, from the far north down to Central America. They have equipped salmon canneries in British Columbia and furnished ice machines for Salvador. The operation of the Vulcan machines is simple and cheap, and they have various designs suited to different purposes, for both large and small plants. The refrigerating plants are used for breweries, markets, canneries, packing companies, hotels, etc.

The Late Henry De Groot.

Dr. Henry De Groot was killed in Alameda on Tuesday by the Santa Cruz train. He was standing close to the track reading a newspaper and did not hear the approaching train. The whistle was blown and engine reversed, but the Doctor was struck by the locomotive and died within a few hours. The body was not mangled, the guard of the locomotive having struck him on the head, throwing him aside.

No mining man in California was more widely known than Doctor De Groot, for he has visited every camp within its borders and has been a writer on mining topics since mining commenced here. He was a pioneer of pioneers, having been sent here in 1848 by Horace Greeley, of the New York *Tribune*, to verify the reports of the discovery of gold. He was probably the first newspaper man on this coast to get an "interview," for he went to Sutter's mill and, on behalf of the *Tribune*, interviewed General Sutter, Marshall, Mrs. Wimmer and others directly connected with the discovery of gold. His letters were widely read, giving as they did the first detailed, authentic accounts of the gold fields of California. Dr. De Groot returned "to the States" for his family, and came back to California, via Panama, in February, 1850.

Since that time he has been closely identified with the mining industry on the Pacific Coast. Every district and camp in California and Nevada has been visited by him. At one time he accumulated considerable money but lost it in mining operations. He was among the first to go to the Comstock and was a pioneer in Reese River, Cortez, Eureka, Pioche and other Nevada districts. In several camps he established newspapers. He was one of the most notable followers of mining excitements, having gone to Gold Bluff in 1851, Kern river in 1854, Fraser river, Washoe, Reese River, Aurora, Meadow Lake, White Pine and other camps when discovered.

For many years he has resided in San Francisco, making occasional trips to the mountains on mining business, but depending largely upon his pen for his support. In addition to writing on mining subjects in the daily papers, he wrote for technical journals, the State Mining Bureau and U. S. Geological Survey. He has been a frequent contributor to the MINING AND SCIENTIFIC PRESS for the last thirty

years, and has, during the past twenty years, taken the editor's place during vacations and other absences from the desk.

There was no better-posted man on the mining industry of this coast than Dr. De Groot. Having visited in person every district and camp in California, he was well known everywhere among the miners and was always welcome in their cabins. He would walk from camp to camp and post himself thoroughly on the country. At the time of the existence of the old Hydraulic Miners' Association he was assistant secretary, and visited all the hydraulic mines in search of data. In this branch of mining he was particularly well posted. During Ralston's time he did a great deal of mine-experting for the Bank of California, and has followed this branch of work, in connection with gravel mines, for a long time.

Dr. De Groot was a peculiar man in habits and in dress. He always wore a single-breasted, long frock coat and a broad-brimmed, white hat such as the early miners adopted in California. He had strong prejudices against liquor and tobacco, and never used either. He was liberal and generous to a fault, giving away his money even when in greatest need of it himself. With any old miner he would divide what he had, or give away all, if asked.

Dr. De Groot was 75 years of age, but maintained his mental and physical faculties in a remarkable way. He was actively at work up to the day of his death. No men in his sphere did more for the mining industry. He was its earnest friend in every way, and his writings have benefited it to a great degree. The Doctor was a companionable man of cheerful disposition, unselfish, and willing to do everything possible for a friend.

Coast Industrial Notes.

THE Mere Island Navy Yard is to spend \$20,000 for dredging along the water-front.

A THICK SAMPLE of first quality mice from which sheets six by seven inches square can be cut was recently brought up from the Yellow Pine country, Nevada.

THE high water destroyed \$4000 worth of salt for Shaefer Bros.' works at the north of San Diego bay, where the Otay and Tia Juana rivers empty on each side.

A 55-FOOT DAM, belonging to E. W. Scripps, on the Miramar ranch, Linde Vista district, San Diego county, was broken down by the high waters last week.

THE Visalia *Delta* is urging the establishment of a cannery for that place, claiming that the large fruit product of this and succeeding seasons will amply pay for its erection.

LOS ANGELES is crowded with Eastern people, and two new buildings, the Stimson and Bradbury blocks, are being put up. They will be finer edifices than the Crocker building in this city.

SUPERINTENDENT REEDY of the Idaho Stage Line has arrived at Ukiah with the news that the late rains have unfitted for use both approaches to the new \$18,000 iron bridge over the main Eel river near the Humboldt and Mendocino county lines.

THE people in Piedmont district back of Oakland intend to have a fine sewer system if money can make one. They are about to hold an election to decide whether bonds shall be issued for \$40,000 for improvement. The election will be held on April 22d.

A DISPATCH from Gila Bend, A. T., says: The Wolfey canal is completed and with the present rise of the Gila ran six feet of water. The overflow washed out the upper portion of the dam, and it will take several weeks to repair the damage, though it is not so serious as was at first reported.

THREE IMPORTANT CO-OPERATIVE INDUSTRIES have been organized in Gilroy. They are tobacco culture and cigar-making; the manufacture of tubular boilers, steam vats for dairies and agricultural machinery, and the manufacture of flour. All give promise of success and the year's outlook is a prosperous one.

THE Cudahy Packing Company has purchased the Nadeau land near Los Angeles for \$197,000, and is now spending \$800,000 building slaughter-houses such as those conducted by Armour in Chicago and Baden. Already the different counties in the south are placarded with announcements that the company will buy 500 hogs daily after May 1st.

THIS has been the grandest season, with but trifling exceptions, ever known to Siskiyou county, and mining and agricultural industries should be more than satisfied. Plenty of rains in the valleys and snow on the mountains are bound to bring good reward, both to the miner and farmer, and stock men have reason to rejoice because of the continuous mild winter, with its entire lack of high winds or storms.

LABOR COMMISSIONER WATTS who has been visiting the southern part of the State in search of information on the labor question, states that there are fewer unemployed men in the vicinity of Los Angeles than in this section, which he claims is partly due to the fact that Los Angeles supports, under the conduct of the Labor Assembly, a free employment bureau, which has helped considerably those seeking work. Mr. Watts greatly favors this plan.

THE explanation of the report from San Francisco that the Secretary of the Treasury has refused an offer of \$1,000,000 in gold, and that he would not consider any more offers, is given as follows: The banks of San Francisco offered the Government \$1,000,000 in gold in exchange for currency in New York. The Secretary de-

clined the proposition because it would involve the cost of transportation to the East and it meant for the California banks exchange free of cost. The Secretary will not refuse offers of gold where the terms are not to the disadvantage of the Government.

THE Columbia river cannery men decided to offer fishermen the old price of \$1 per salmon for the coming season, which will begin April 8th. The Fisherman's Union will consider the offer. About half the canneries were represented at the meeting. The up-river canneries of Cook, Warren, Harrington and Winter and Hapgood were not represented. The new can factory established at Astoria by San Francisco parties has already received orders for the entire supply of three canneries.

NEXT WEEK, at Mare Island, the monitor Monadnock will be hauled up under the 100-ton shears, where she will lie for a while for the purpose of having her boilers put in. The boilers have been hauled down from the boiler-shop and present a fine-looking appearance. Those who have inspected them pronounce them to be the finest piece of work that has been turned out from the shops. The military mast is lying on the forward part of the deck of the monitor and will also be placed in position.

ONLY a little more than a month now remains in which the 20,000 Chinese in this city may comply with the provisions of the Geary law and register themselves. Should every one of them disobey the mandate of the Six Companies and present themselves for registration, not half of their number could be accommodated. But there are no signs of a break in the ranks of the Mongolians, and the treasury officials at Washington have evinced a determination to stand by the action of the last Congress in the matter. Hence a wholesale deportation seems near.

A LARGE DEPOSIT of gypsum has been discovered at Coalinga, Fresno county, and an analysis shows it equal to the best. Extensive preparations are made for opening it. The San Joaquin Valley Coal Mining Company has secured the property and mill and crushing works are now being erected on the grounds. Workmen are taking out large quantities of gypsum. The fields lie in the Coast Range mountains in the vicinity of the oil fields. The railroad runs within a short distance of the deposits and the coal mines are at hand furnishing fuel for running the mill. The first carload of gypsum will be shipped from the mill in a few days. It will be used to fertilize land and neutralize the alkali.

THE ship Oimara from Calcutta brought for the San Quentin prison 4500 bales of raw jute worth \$50,000. When the present cargo of raw jute is landed safely in San Quentin there will be in the prison at that place, uncovered by insurance, 1,500,000 manufactured grain bags, worth \$90,000 at the lowest price for bags to-day, and \$60,000 worth of raw jute, or a total of \$150,000 worth of inflammable property. There is in all 120,000 bales of raw jute purchased and due at San Quentin prison within the coming eighteen months, outside of the manufactured bags now on hand, and the Prison Directors are worrying a good deal about its being uninsured. The law does not permit the insuring of State property.

THE Metropolitan Electric Road has received three of its large new open double-ender electric cars and they were placed on the road running from Eddy and Powell streets to the park. The cars are of a dark walnut color. The interior is entirely open, excepting for a partition which separates the two dummies, rear and front. The interior seats will hold twenty persons, while the dummies will hold sixteen more. Additional cars of the same pattern will soon be put on. A number of closed double cars are also being built. As soon as all these are received cars will be run regularly on the branch from Page street via Carl street to the Olympic Club grounds, which the company has been unable to operate as yet owing to the heavy travel on the Page-street line.

SAN FRANCISCO shipped by sea last year 21,332,500 feet of lumber valued at \$495,500. The principal markets now for lumber are the United Kingdom, Australia, Central America, Mexico, Hawaiian and other Pacific islands and South America. Europe was added to the list in 1883. Occasional shipments have been made to New York by sea, and considerable lumber is also sent by rail to the Eastern cities. The large lumber interests in Oregon and Washington are practically controlled by California capitalists, and most of the export orders are received in San Francisco, though the vessels are loaded at the mill ports at the north, at Eureka, Humboldt county, on the Columbia river and at Puget Sound ports.

THE American Ship-Windlass Company of Providence, R. I., has secured the contract to furnish the Mare Island Navy Yard with a forty-ton traveling crane for \$55,866 23. As the appropriation made by Congress was \$60,000, the remainder of the money will be expended in laying the track around the coping of the dock. By the time the crane is in place the armor for the Monadnock is expected to arrive. She will then be put in dock and by means of the crane the huge sheets of metal will be hoisted and lowered in position on the sides of the fighting craft. The machinery is now well under way in the shops and the work of assembling each part is going on all the time. The large iron knees for the bridge, located on the forward part of the superstructure, were set in place a few days ago.

THE dam of the Gila Bend Irrigation Co., 60 miles southwest of Phoenix, A. T., was washed away during the recent high water on the Gila. The damage is estimated at \$100,000. The rise in the river was not an unusual one, the trouble lying in the faulty construction of the dam. It was constructed between high, rocky walls, several hundred yards in width, and in the channel, where the water ran with terrific force, a large, well-built canal has been constructed to carry the water around on the lands above Gila Bend, but it was never filled, though thousands of acres of grain and fruit have been put in this spring in anticipation of abundance of water. The site is a grand one for a dam and the water supply is ample. It is believed that a proper dam will soon be put in place of the one destroyed.

The Price of Silver.

TO THE EDITOR:—Will the price of silver rise or fall? That is the question which is agitating the minds of many people at the present time. I think it will probably do both, falling first and then rising slowly.

The British Government is said to hold the key to the situation, and it does not seem disposed to extend the utilization of silver in the form of coin. Our own Government appears to be in a similar mood, despite the existence of a strong party which favors a different course. Moreover, I do not believe that the remonetization of silver by those and other Governments would alone suffice to restore that which is (facetiously?) called "parity," though it would no doubt help toward such a result.

Legislation may affect, but cannot control, commercial values. If all the Governments should decree a ratio of silver to gold as 16 to 1, the result would be either a commercial discount on silver coin (or a premium on gold, which is the same) or gold would be hoarded and become a tradition in commerce.

The statistics of recent years show an increasing production of both gold and silver, throughout the world at large. In 1892, the United States is reported to have produced silver to the value of about sixty millions of dollars, reckoning at the rate of 87 cents per ounce as an average price for the year, against thirty-three million dollars in gold. Australia produced a little more gold than California, but Australia is also a large producer of silver. Mexico produces more silver value, at present prices, than gold value, while the reverse is true of Africa and Russia. On the whole, the output of silver, at the comparatively low average price of 87 cents, is in excess of that of gold.

If our Government shall stop purchasing silver as it is now doing, and especially if it should decide to sell the stock on hand, as some think should be done in order to force (!) Great Britain to change her policy, I think the price of silver must fall, perhaps heavily; but the lower it falls the more rapidly will the production diminish, and this must cause it to rise again in time, perhaps to be again lowered by overproduction.

The value of the precious metals is to a great extent conventional; it does not grow out of any real necessity, as does the value of iron, for example, and the specific value of silver—that is, its value per ounce—may, I think, be looked on as the quotient of an aggregate divided by the number of ounces available, that aggregate representing the estimation in which the world holds silver in its totality; it is not a fixed quantity, but its mutations are controlled largely by caprice, and are, therefore, in a measure, independent of the laws which govern the demand for more useful products.

Cheap as silver is considered to be, it is not cheap enough to be considered as one of the very useful metals, like copper or lead; it is not one of those things which we *must* have; its chief employment, otherwise than as coin, is for purposes of ornament and luxury, for which purposes facility of acquisition is a disqualification, not an inducement to larger consumption. Moreover, for ornamental purposes, and even for useful purposes, it is largely superseded by nickel, which is cheaper and in many cases better, by various alloys, and by gold, which is now within the reach of many of the class which in former times was satisfied with silver. Who, in this country, now wears a silver ring or chain? When good wine is cheap, people drink more of it, but the cheaper silver becomes the less will it be in demand for some purposes. Again, silver is not perishable like potatoes, nor is it immediately destroyed by use like wine.

Wine and silver are both, in the main, luxuries, and as such may be compared. The comparison, however, shows this important difference: that while wine is completely destroyed by use, and while such use promotes further consumption, silver is not usually consumed, but remains to give pleasure to its possessor, so that the person who has once gratified his desire for a bauble, such as a silver punch-bowl or teapot, is not likely to want another for many years, if ever. For these reasons the stock of silver tends to accumulate easily and the accumulation is disposed of but slowly, even if not maintained or increased by the supply.

The need of coin does not increase with the growth of population and the extension of industries—that is, not in the same proportion. The reason is that, in the transaction of the world's business, coin, a semi-barbarous device, the first step in advance of simple barter, is largely superseded by the system of clearing houses and other contrivances of advancing civilization. If all the world were honest there would be no need of precious metals for coinage. It is indeed, as another writer has said, a pitiful thing that one set of men cannot exchange the products of their respective industries unless another set of men waste their lives and energies by toiling in dark, noisome holes in the ground for metals which are otherwise not worth the pains; but we must take the world as it is, not as it may be. Yet, as I have said, the use of coin is in part superseded already by that of more civilized devices.

By common accord of the chief nations for ages gold has been the ultimate standard of value. It is not a perfect standard, for it moves. A tide-gauge which should itself rise and fall would give a false record of the ebb and flow of the waters. The ancient sages puzzled their heathen brains in a vain endeavor to find a criterion of truth, and in our own day a "perplexed philosopher" has brought all the resources of his immense learning, all the power of his eloquence and all the force of his logic to the task of defining "absolute right," with a net result which would be ludicrous if it were not pitiful. So the scientist seeks an absolute standard of dimension and weight, and the political economist yearns for a changeless measure of value. For the latter some have proposed wheat, others labor, but nothing has been found to answer so well as gold, fictitious, conventional and mutable though its value is.

The effect of a fall in the value of gold is that other values seem to rise; but as other values are constantly

rising and falling in fact, a change in the value of gold is difficult to verify in any short period. The *price* of gold does not vary, because that price is stated in terms of gold, and it is clear that an ounce of gold must always be worth two half-ounces of gold. Now, the fact that gold has fallen in value since 1850 is proved by many other facts, and the tendency of that fall has been to raise the *price* of silver. Why, then, has the price of silver fallen? For the very same reason that the value (not price) of gold has fallen, namely, increased production (in a still greater degree). Many of those forms of wealth which are created by labor, which owe their utility and thus their value to labor bestowed upon them, as gold and silver do not to any great extent, have also fallen in price. Why? Because of increased facility of production and distribution; because of the advance of civilization which enables us to toil less or to enjoy more. Has the price of land fallen, in general? Has the wage of labor lessened throughout the world? No.

We hear a great deal about debtor classes and creditor classes, and we hear a good deal of rot. The fact is, that the man, or the nation, that contracted a debt many years ago, is the gainer to-day by the depreciation in the value of gold, and yet he wants to pay in silver, which has depreciated still more. A few hundred years ago, in England, a quarter of beef cost fourpence; to-day a pound of beef costs twice fourpence. Other common things were in proportion. This shows that money was worth more then than it is now, and, in like manner, though in less degree, money is cheaper now than it was forty years ago.

As to silver, its production must decrease for a time if its price is to rise much, and that will be the case. A certain rise will also come about from the greater production of gold, which must result from increased activity in gold mining, owing to the diversion of capital and labor from silver mining; but the increase of price thus caused will be fictitious—it will be an apparent rising of the tide from the sinking of the gauge. In the meantime, if the country needs more circulating medium, which I doubt, and is not civilized enough to use paper, which I believe, let our own silver be coined, either for what it is worth, in which case it will be "as good as gold," or for more than it is worth, in which case it will partake to a certain extent of the character of paper money, but without the destructibility of paper. This utilization of a large quantity of metal will help to raise the price in a legitimate way, but the silver should be bought in open market in justice to the people. (There is enough on hand now to occupy our mints for a long time, but that is in circulation by proxy.)

The value of coined silver may, for home use, have any relation to the value of coined gold that the law may give it, and I see no reason why a Government like this should not anticipate any probable rise in the price by giving it a legal tender value above the present price. If there should be, for a time or permanently, any apparent gain by so doing, that gain would be shared by the whole people. Such money would not pass at its face value in foreign countries, except, perhaps, such as could use it in the purchase of goods here, until an increased price of silver should bring it to par; until then it would be only hulloin, just as Mexican dollars, really worth more than our own, are not money, but only merchandise here.

My own interests incline toward increased activity in silver mining; hence, personally, I should be glad to see the metal commanding a high price. But I never allow personal interest, whether my own or that of another, to warp my judgment nor control the expression of my opinion. I consider the present depression to be the effect of overproduction, and I believe the demonetization of silver, by which the depression has been increased, was itself caused by the fears of financial disturbance resulting from the rapid production and impending fluctuations of value of the metal. Favorable legislation would help to raise the price, though whether such legislation is or is not desirable on other grounds, I do not pretend to judge.

Whether or not the demonetization of silver by these United States in 1873 was a wise measure, the fact remains that it was done; it is not so clear that remonetization, even if it could be accomplished, would restore the *statu quo ante*. As to California, the effect of the low price of silver is already felt in an increased demand for gold mines, and I have no doubt the present year will bring a considerable increase in the output of our mines, which should help us to bear the misfortune of our neighbors with Christian fortitude. Gold has always been good enough for Californians, and the faster we dig it out of the ground the sooner will the silver men be made happy by the restoration of the much-lamented "parity."

The learned are prone to fishing in deep waters for that which lies on the surface, and I fancy the silver question is more muddled than mysterious. C. H. AARON.

San Francisco, March 18, 1893.

The Silver Question.

SHASTA, CAL., March 20, 1893.

TO THE EDITOR:—In your issue of March 18th appears an article written by C. H. Aaron on the cost of silver. It gives correctly the condition of silver from a gold standpoint, and did not intend to show the reason why silver is debased as a money metal, but does, and in this way: "If we should all stop eating wheat and use corn instead, the price of wheat would go down and that of corn would go up, regardless of the cost of production." Just so. That is what has been done with silver. Let me change the wording, but not the meaning. If we should stop using silver and use gold instead, the price of silver would go down, while gold would come up, regardless of the cost of production.

That is what degraded silver as a money metal. By the demonetization of silver, the bullions parted value never to be equal until we use it as before. The bullion value of the silver dollar was greater than the bullion value of the gold dollar on the day it was demonetized. Then why was it done? What reason can be given for the act? The output of silver has increased since 1873, and so have its demands. It was demonetized to make way for an interest

bearing paper money issued by the national banks. This national bank money is well secured and is a good money, but too expensive. The scheme is to draw two interests on the same value. The bonds deposited with the United States draw interest; the national bank note based on these bonds is loaned out for another interest. This is drawing double interest on the same value.

John Sherman, being the chief schemer in this, says it is a good financial policy. If it is, then interest-bearing money issued by a corporation is better than gold and silver coin and gold and silver certificates issued by the Government of the United States that bears no interest.

But silver was demonetized to make way for the corporation money. Mr. Aaron writes about silver miners bawling "special clients." The writer has mined silver many years and did not know he should have one.

Again Mr. A. says: "Do the silver men think the world will pay more for their silver than they have to? No, they are not such fools!" That is not expected; neither are the silver men such fools as not to know what caused John Sherman to drop the silver dollar from the list of coins of the United States.

Senator Stewart of Nevada says it was accomplished in a manner no better than brute force. The more this question is studied, the plainer becomes this truth. Much has been written about the dishonest silver dollar by gold men. I would like to ask if it was not an honest dollar on the day it was demonetized? I would like to know if the bill demonetizing it was not put through Congress in a stealthy, sneaking and underhanded manner. Gen. U. S. Grant, at that time President, said he knew nothing about signing a bill demonetizing silver. James G. Blaine, speaker of the House, said he knew nothing of such a bill. These things must be proven false by the gold men, or silver will soon be placed where it belongs, as one of the money metals of this country.

Give us gold and silver coin, gold and silver certificates issued by the authority of the United States, and obliterate all other moneys, and we will not have too much silver or gold. J. E. BELL.

COL. C. F. CROCKER, in an interview in a New York paper says: "The Pacific Coast is going into manufacturing more heavily. We have new and large meat-packing establishments, furniture factories, iron foundries, extensions of wagon and carriage factories, etc. The recent sending of fresh fruit to Europe in refrigerated cars by express train and steamer was not unsuccessful. It was an experiment that taught those engaged in it what changes were necessary in order to make the reaching of the new market a success. It was learned that some improvements in the plan were to be made to preserve the flavor, the quality of the fruit while suspended so long in cold storage. A method for accomplishing this and securing the widened market will undoubtedly be found. Railway constructions within the State is going on continuously. Branch lines are being built to develop the valleys of California. A line is being run along the coast between San Francisco and Los Angeles, which cities have heretofore been connected by an interior route. It is quite probable that a new through railway system with the East will be carried through by the extension of some one of the principal railway lines from its western terminus to the Pacific. The systems that now have far-western termini have contemplated extensions to the coast and have surveyed the route, though no road is yet actually under construction."

THE miners at Nanaimo are worried over a visit of John Rosenfeld who has the controlling interest in the new Vancouver coal company. This visit is generally believed to have been caused by the necessity of a reduction in the miners' pay in order to make the collieries compete profitably with other similar concerns. The Rosenfelds handle almost the entire output of this colliery. Lately, owing to a poor market, low freights from England and Australia, it is said they have been losing money. If they are to continue to handle the Nanaimo product it must be delivered at San Francisco cheaper; therefore a reduction in miners' pay is necessary; otherwise the mines will be closed down, resulting in the collapse of the whole district which depends entirely upon the mines. The Union at Nanaimo is a strong one, and it is believed it will strenuously oppose a reduction, but rather than allow the mines to be closed might submit to a reduction of 25 cents per ton.

MR. ALF. TREGIDGO, of Grass Valley, has in the city some exceptionally rich rock from the Hudson Bay mine, Massachusetts Hill, Grass Valley. The quartz from the ledge shows free gold abundantly, but from the gouge a great quantity of crystallized gold has been obtained. The gold is in large pieces peculiarly formed. Many persons familiar with mines have been to see this gold and the material from which it came, and all declare it very curious. There is an abundance of fine gold also in the stuff. A number of small shafts have been sunk on the property near by, but the new one sunk by Mr. Tregidgo is the deepest. The old ones were abandoned when water was struck, and the new shaft is the farthest to the north. The ground laid idle for many years until Mr. Tregidgo organized the company to work it.

THE managers of the Sunset Telegraph-Telephone Company in Oakland commenced an important piece of work last week. The trench wherein the cable holding the telephone wires will be laid was dug for a few blocks. The first run of cable will extend from Washington to Oak on Twelfth street. The second cable will be put in on Broadway and will extend from Fifth to Eighteenth street. The third cable will extend from Twelfth to Eighteenth on Clay street. The Broadway cable will also take in all the wires on Washington and Franklin streets. This will leave a clear field for the Western Union company to wrestle with the electric wires which are now causing so much trouble. There are now so many electric roads in operation in this city that it is very unsafe to have overhead telephone or telegraph wires.

Mines at Elk City, Idaho.

ELK CITY, March 16.

TO THE EDITOR:—Everything indicates a mining boom in Elk City district which will equal those of pioneer days. The rich bodies of auriferous gravel that have been lying dormant all these years are now attracting men of capital and energy. Never before was there such eagerness to secure placer mining ground by men of means. On every side new mines have been taken up and prospected.

The appropriation by the legislature of money sufficient to build the wagon road from Grangeville to Elk City, together with the low price of silver, is bound to bring mining men this way. Heretofore the only means of transportation was the patient Cayuse, which made freight very high—even the commonest kind was two cents per pound from Grangeville to the mines, while heavy machinery was out of the question altogether. As an instance of freight rates over the trail, one piece of machinery for the big steam dredge on Red river cost the company over 40 cents per pound, although it weighed only a little over 500 pounds. Certainly this State of affairs was bound to keep mining men from investing in refractory, low-grade gold mines. Now, with a wagon road, things will be different. The very heaviest pieces of machinery can be hauled in here for less money than the commonest kind of freight was packed in for over the trail.

This is the reason why large capitalists are attracted to this camp in greater numbers than ever before, and every mail brings letters of inquiry from some of the most conservative and reliable mining men in the country asking for information about this wonderful camp, the fame of which has spread to all parts of the country.

Now that the transportation problem is practically solved, the people are happy, and with energy born of hope have started to develop their claims. Where only assessment work was done before everybody is preparing to go to work in earnest, and tunnels are being run and shafts sunk on almost every claim. Men who had left the camp to spend the winter with their friends are returning every day, so that within a month every claim in the camp will be worked at least by the owners.

Those who are financially able to put up mills to work their mines are actively discussing the best modes for treating these refractory ores, so that the air is full of stamp mills, Huntington mills, Crawford mills, concentrators and cyanide of potassium; and, by the way, in every case where ore was sent to Denver for treatment by the cyanide process the returns show a saving of upwards of 90 per cent.

Even with the small amount of development work done in the camp there are thousands of tons of ore in sight, most of which can be quarried out and rolled into the mills, so that the cost of mining the rock would be almost nothing, and the hills are so steep that most of the ore could be conveyed from the mines right into the mills by gravity. The country is well watered and nearly all the veins are cut by streams large enough to furnish power for almost any sized mill. The mountains are covered with a thick growth of timber, principally red fir, yellow pine, white fir and tamarack, suitable for both mining and saw timber. The ore of the district is sulphuret of iron and carries from \$8 to several hundred dollars per ton in gold, with about \$2 in silver. From assayers who have been testing this ore I learn that there is just a trace of copper, but no zinc or antimony, and sometimes they find just a little lead in the gold-bearing rock. There is some silver ore in the camp but it is confined to a few claims.

A custom mill would be a great boon to individual claim owners and all poor men who have good claims but are financially unable to put up reduction works of their own. Besides, a plant that would save a good percentage of the gold that is in this ore would pay its promoters an immense interest on the investment; in fact it would more than pay for itself in one year.

M. L. MURRAY.

The California Building.

We present herewith an engraving from a recent photograph showing the California building at Chicago as it approaches completion. A California building, surrounded by snow, will strike the dwellers in the greater part of the State as something of an anomaly: only in Chicago and on

the Sierra Nevada is California property thus envionored. The view of the building will give a better conception of its size and impressiveness than sketches previously presented. It certainly promises to give the Californian visitor to Chicago a patriotic thrill on approaching it. We must acknowledge, however, that we are a little disappointed at the prominent intrusion of the Greek style upon the nearer end of the building. What harmony there can be in this commingling of unrelated styles we cannot see. Perhaps some comfort can be derived from considering it prophetic and indicating that California is to engraft Greek culture and refinement upon *padre* piety and devotion. If so, perhaps the idea is good enough to go to the World's Fair.

The New Road Law.

The late legislature amended the old road law by passage of a new. Its full text is as follows:

SECTION 1. Section twenty-six hundred and thirty-three of the Political Code is hereby amended to read as follows:

2633. Any owner or occupant of land adjoining a highway not less than three yards wide, may plant trees in and along said highway on the side contiguous to his land. They must be set in regular rows, at a distance of at least twenty feet from each other, and not more than six feet from the boundary of the highway. Whoever wilfully injures any of them is liable to the owner or to the occupant for the damage which is thereby sustained; *provided*, if, in

4. Contract, agree for, purchase, or otherwise acquire the right of way over private property, for the use of public highways, and for that purpose institute, or require the District Attorney to institute proceedings under title seven, part three, of the Code of Civil Procedure, and to pay therefor from the District Road Fund of the particular district.

5. Levy a property tax for road purposes.

6. In their discretion, cause to be erected and maintained on the highways they may designate, mile-stones, or posts, or guide posts properly inscribed.

7. Cause the road tax collected each year to be apportioned to the several road districts entitled thereto, and kept by the Treasurer in separate funds.

8. Audit all claims on the funds of the respective road districts, when required to pay for work or improvements thereon.

9. In their discretion, they may provide for the establishment of gates upon public highways in certain cases to avoid the necessity of building road fences, and prescribe rules and regulations for closing the same, and penalties for violating said rules; *provided*, that the expense for the erection and maintenance of such gates shall, in all cases, be borne by the party or parties for whose immediate benefit the same shall be ordered.

10. For the purpose of watering roads in any part of the county, the supervisors may erect and maintain water works, and for such purpose may purchase or lease real or personal property. The cost of such water works and the watering of said roads may be charged to the General County Fund, the General Road Fund and the District Fund of the district or districts benefited.

11. In their discretion, they may advertise for bids to grade, turnpike, gravel, or sprinkle any road or roads in any road district, which contract shall be let to the lowest responsible bidder; *provided*, the Board may reject any or all bids, whenever it shall appear to them that the same are too high. The advertisement of such bids shall specify the road or roads upon which such work is to be done, the kind, character, and extent of the same, so as to plainly indicate to bidders the work to be bid for; and shall, when in their judgment the same is necessary, cause the County Surveyor to survey and furnish a profile of the proposed work, showing cuts, fills, and grades as fully as practicable, which profile shall be open to inspection at the office of the Board of Super-

visors. When such work is completed, the same shall be inspected by the Board of Supervisors, or by a committee of the board appointed by the chairman to inspect and report upon the same. And no payment shall be paid for such work until the same has been inspected and accepted by the board or such committee; *provided*, the Board may, in their discretion, advance not to exceed thirty per cent of the amount of such contract, after the work is at least half completed. Such advertisement for bids shall be in such newspaper as the Board may designate, and be published for the period of at least two weeks, and notice of such letting shall also be posted by the Road Commissioner in three conspicuous places in the district where such work is to be done, for at least ten days before the day set for opening said bids and awarding contracts. Bids shall be inclosed in a sealed envelope, directed to the Clerk of the Board of Supervisors, and shall be endorsed across the face of the envelope, "Bids for road work, ——— District," giving the name of proper district.

Section two thousand six hundred and forty-six of said Act is hereby repealed.

SEC. 4. Section twenty-six hundred and forty-five of said Act is hereby amended to read as follows:

2645. Road Commissioners, under the direction and supervision and pursuant to orders of the Board of Supervisors must:

1. Take charge of the highways within their respective districts and shall employ all men, teams, watering carts, and all help necessary to do the work in their respective districts; *provided*, that no Road Commissioners shall be interested, directly or indirectly, in any contract or work to be done in the road district under his charge and control.

2. Keep them clear from obstructions, and in good repair, and destroy, or cause to be destroyed, at least once a year, all thistles, Mexican cockle-burs, of any kind, and all noxious weeds growing or being on any portion of the public highways or public roads in their respective districts.

3. Cause banks to be graded, bridges and causeways to



THE CALIFORNIA BUILDING AT THE CHICAGO WORLD'S FAIR.

the judgment of the Board of Supervisors, the whole width of such road is needed for use of highway purposes the whole thereof may be used.

SEC. 2. Section twenty-six hundred and forty-one of said Act is hereby amended to read as follows:

2641. The Board of Supervisors of the several counties shall divide their respective counties into suitable road districts, and may change the boundaries thereof, and each Supervisor shall be *ex-officio* Road Commissioner in his supervisor district, and shall see that all orders of the Board of Supervisors pertaining to the roads in his district are properly executed; *provided*, when in any county the members of the Board of Supervisors thereof are not elected by districts, it shall be the duty of such Board, by proper order, to be entered in its records, to divide such county into supervisor districts to correspond with the number of members of such Board, and to assign to each member thereof one of said districts, of which he shall be such Road Commissioner; when not otherwise provided by law he shall receive for his services as such Road Commissioner twenty cents per mile, one way, for all distances actually traveled by him in the performance of his duties; *provided*, that he shall not, in any one year, receive more than three hundred dollars.

SEC. 3. Section twenty-six hundred and forty-three of said Act is hereby amended to read as follows:

2643. The Board of Supervisors of the several counties of the State shall have general supervision over the roads within their respective counties. They must, by proper order—

1. Cause to be surveyed, viewed, laid out, recorded, opened, and worked such highways as are necessary to public convenience as in this chapter provided.

2. Cause to be recorded as highways such roads as have become such by usage, dedication, or abandonment to the public. Also all such streets and roads as have been or may be declared such under section seventeen hundred and sixty-four of the Code of Civil Procedure.

3. Abolish or abandon such as are not necessary.

be made when necessary, keep the same in good repair, and renew them when destroyed.

SEC. 5. All Acts and parts of Acts in conflict with this Act are hereby repealed.

SEC. 6. This Act shall take effect and be in force from and after its passage.

Classification of Mineral Waters.

Mineral waters have been used from time immemorial as medicinal agents, but always with exceedingly variable effects even with the use of the same waters and for the same diseases. This irregularity of action is to be accounted for by reason of the instability of some of the most important qualities; for, although water is the most universal solvent in nature, its operations in this respect are on very different scales, chiefly depending upon its temperature and the amount and kind of gases and acids it holds in solution.

The solvent power of water, when heated under pressure to a temperature above 212° Fahrenheit, is greatly increased, inasmuch that the late Dr. Turner found that pieces of glass enclosed in the upper part of a high-pressure steam boiler, worked at 300° F., at the expiration of four months were found completely corroded by the action of the water; that which remained was a mere white mass of silica, destitute of alkali, while stalactites of silicious matter, above an inch in length, depended from the little wire cage which enclosed the glass. This experiment aptly illustrates the conditions and the changes produced by the action of water confined at a high temperature in contact with various mineral substances in the interior of the earth. Pressure also exercises a marked influence on the absorptive power (the solution) of water, of gases independent of temperature; and this condition, probably more than any other, is made use of to the detriment, or at least to the change of quality, of mineral waters in common use.

Gases are soluble in water in very unequal quantities of the different gases at different temperatures. For example, at 32° F., one volume of water dissolves somewhat less than one-twentieth of its volume of hydrogen and exactly one-fiftieth of its volume of nitrogen, while it dissolves five hundred and six and one thousand and fifty volumes, respectively, of hydrochloric acid and ammonia. And again, at the same temperature, 32°, it dissolves 1.8 times its volume of carbonic acid, while at 62° it dissolves only half as much. Ordinarily, the greater the pressure the greater the quantity of gas absorbed. Gases moderately soluble in water follow a chemical law (of Henry and Dalton) according to which the quantity of gas dissolved is proportional to the pressure. But gases which are exceedingly soluble in water, ammonia and hydrochloric acid, for example, do not conform to this law; these gases are soluble up to eight hundred or one thousand times their volume.

Salts generally are soluble proportional with the increase of temperature, but they deposit on the cooling of the water. There are some important exceptions, however, the most remarkable of which is that of common salt, which is about equally soluble at all temperatures. And a few there are—hydroxide and certain organic salts of calcium, for example—more freely soluble in cold water than in hot. And there are some salts so extremely soluble in water that they extract the vapor from the atmosphere and dissolve themselves in it. Such are the conditions common to mineral waters as they obtain everywhere.

Everybody knows that the most stable qualities of mineral waters are the easily ascertainable mineral substances taken up and held in solution from the geological strata from which the water springs, or through which it has passed. But if the no less important volatile qualities—the temperature, by means of which the mineral substances are held in solution, and the kind and quantity of gases contained in it as it springs to the surface—are ignored in the too great haste to put it upon the market, it is a very imperfect imitation. Indeed, it is upon the continued presence, approximately at least, of the same temperature, kind and amount of gases, by which the water is empowered to hold the mineral substances natural to it in solution, no less than upon the mineral substances themselves, that its true therapeutical properties depend; hence the difference in the effects of mineral waters partaken at their source, and those designed to represent them, served in bottles.

Moreover, with reference to bottled waters particularly, in the effort of bottlers to replace the gases that begin to escape from the water at the springs the moment it is relieved from pressure—which it is difficult, if not wholly impracticable, to duly estimate—it is frequently surcharged with carbonic acid to such a degree as to effect a change in its properties, inasmuch that alkaline waters at the springs are not infrequently acidulated waters in the hands of physicians and their patients, liable to wholly different effects from the remedy intended. Besides, there are many people, and some of them physicians, who are so little acquainted with the properties of mineral waters that they estimate their freshness and excellence according to the amount of carbonic acid they appear to contain on drawing the cork.

Clearly such a classification of the mineral waters of the United States as will indicate all their chemical constituents and therapeutical properties is impracticable.

Their therapeutical properties are indicated by what they hold in solution and their temperature. Hence they are acid, alkaline, alterative, antacid, astringent, caloric, diaphoretic, diuretic, lithontriptic, purgative, refrigerant, stimulant, tonic, or a mere luxury, according to what they hold in solution and their temperature; and it is the physician's sphere to appropriate them.

The following classification is believed to be sufficiently comprehensive to include the properties of all the mineral waters in the United States hitherto described.

1. ACIDULOUS WATERS.—These owe their virtues chiefly to the presence of free carbonic acid gas, commonly due to the decomposition of iron pyrites in the crystalline rocks, by which sulphuric acid is formed. The contact of

sulphuric acid with the carbonates liberates the carbonic acid gas, and this, being absorbed by the water, communicates its acid properties. The amount of carbonic acid must, of course, be in excess of that which is required for combination (forming carbonates of bicarbonates) with any chemical substances contained in the water, and the strength of the acidulous water is to be determined by the proportion of such really free carbonic acid only. Such waters greatly vary in the amount of their solid constituents, and thus different waters of this class also possess the properties of some one or more of the other groups, into which they may also be classified with equal propriety.

2. ALKALINE WATERS.—These are commonly distinguished by containing carbonate of sodium and free carbonic acid, and, in rare instances, the biphosphate of sodium, with or without the presence of chloride of sodium and sulphate of sodium also. Hence, they may be alkaline sodic or acidulous alkaline, containing bicarbonate of sodium; alkaline muriatic, containing the chloride of sodium; or alkaline saline, containing sulphate of sodium—all variable. In some cases the products of the decomposition of the silicates are chiefly sulphates and carbonates of the alkalis, and, if the latter are abundant, they will, on account of their extreme solubility, render the water decidedly alkaline. And these are commonly highly charged with free carbonic acid, as, for example, Vichy water. In the purest alkaline waters there are scarcely any solid ingredients except the carbonates of the alkalis. Alkaline waters are also not infrequently met with both as thermal and cold springs.

3. CALCAREOUS OR EARTHY WATERS.—These waters are characterized by the presence of the sulphates and carbonates of lime and other alkaline earths, frequently held in solution by an excess of carbonic acid. Sulphate of lime is the particular salt upon which the properties of these waters commonly depend, but most of the springs containing it also contain the carbonate of lime. These are the waters generally designated by the name "hard waters." The phosphate of lime is also sometimes found in calcareous waters, and, in the absence of an excess of the sulphates and carbonates, it is a valuable constituent.

4. CHALYBEATE WATERS.—These waters are characterized by the presence of iron. The form in which it is found is, with rare exceptions, the bicarbonate of the protoxide, held in solution by the excess of carbonic acid with which the water is charged. Chalybeate waters are for the most part cold, although they are sometimes thermal. They are frequently strongly acidulous, from the large excess of carbonic acid which they hold. Upon prolonged exposure to the air the iron salt gradually undergoes decomposition and separates from the water as hydrated oxide of iron, the free carbonic acid escaping. The sulphate of oxide of iron is sometimes present in these waters, but it is in exceedingly small quantity; and "some of them contain a not insignificant amount of bicarbonate of sodium, and are therefore 'iron acidulous' springs; others contain Glauber salt (the maximum three-fifths grammes to the litre), and are therefore called 'muriatic acidulous iron springs.' Finally, some contain a certain amount of carbonate or sulphate of lime (maximum of two grammes to the litre): these are called 'earthy acidulous iron waters.'"—Ziemssen.

5. CHEMICALLY INDIFFERENT WATERS.—This group comprises such waters as do not contain a sufficient amount of any chemical substance as to give a distinctive character, yet they seem to possess properties which give them some medicinal value. As no natural water has ever been found perfectly free from the solution of gases or other substances, extraordinary freedom from such substances suggests that such water may be partaken of in larger quantity with impunity, and that, on account of its greater purity, it possesses proportionately greater absorptive power, indicating its usefulness.

6. SALINE WATERS.—These are, for the most part, solutions of halogen compounds of the alkalis, commonly distinguished by the presence of a large amount of the chloride of sodium, or common salt. But they also comprise solutions of the chlorides of calcium, magnesium, potassium, lithium and aluminum. And some are said to contain small amounts of the iodides and bromides of soda, arsenic, potassium, calcium and magnesium, but in very minute quantities.

7. SULPHURETTED WATERS.—These chiefly depend for their properties upon the presence of sulphuretted hydrogen, and are commonly distinguished by their odor, independent of analysis. The sulphuretted hydrogen in these waters is formed by the oxidation of iron pyrites in contact with water. The sulphides of sodium, calcium, magnesium and potassium are sometimes present in these waters, singly or together, but always in very minute quantities; as, indeed, the sulphuretted hydrogen—the amount held in solution by water or given off from it—varies from a mere trace to forty-two cubic centimeters in the litre. These waters are widely distributed, cold or thermal in various degrees.

8. UNCHARACTERIZED WATERS.—This group includes all mineral waters whose properties are not sufficiently well known by analysis or otherwise to signify their properties. Dr. A. N. Bell in the Sanitarium.

THE Olympic Salt Water Company, which is to bring salt water from out near the Cliff House, into the city, has part of its pipes already laid, and a contract has been let for the rest. The company is preparing to furnish not only salt water, but hot salt water, direct to consumers' bathrooms all over the city. They are completing arrangements by which, at the power-house, they will use the salt water to condense their steam, and the company will use the steam to heat the water. That is, the exhaust steam from the engine will be run through pipes over which the water from the mains is flowing. The company is also going to build three immense baths to be supplied with warm salt water, just like that in the Olympic Club, and will locate them in different parts of the city. One will be near the Palace Hotel, not far from the Edison Electric Light Company's works. The second will be at the corner of Tenth and Howard, and the third one will be

close to the Park, in the vicinity of the point where California street intersects the Western addition. These baths will be large; very large, so that they will not only accommodate a big attendance of bathers, but one will really think he is having a swim. These baths will be fitted up with every possible convenience. This plan of utilizing steam to heat the water will enable them to fill the baths with warm water without additional expense, and placing them as they are, in different parts of the city, everybody will be able to take advantage of them.

The Capital Removal Question.

The proposition to move the State capital from Sacramento to San Jose meets with decided opposition in the southern counties where it was supposed it would be popular. In that district there is an almost universal sentiment favorable to independent Statehood and the whole influence of this feeling is against the San Jose proposition on the ground that it would postpone if not defeat the project of State partition. Of 104 local papers (representing all parts of the State) which we notice as having rendered judgment on the question of removal, 56 are for Sacramento and 48 for San Jose. The list for Sacramento is as follows: *Anaheim Gazette*, *San Benito Advance*, *Placer Argus*, *Benicia New Era*, *Ontario Record*, *Santa Ana Blade*, *Redlands Citograph*, *Woodland Democrat*, *Stockton Independent*, *Oroville Mercury*, *Red Bluff Sentinel*, *San Diego Sun*, *Fresno Republican*, *Colusa Sun*, *Rodeo Daily News*, *Red Bluff People's Cause*, *Fresno Expositor*, *Visalia Delta*, *Marysville Appeal*, *Kern County Gazette*, *Sonoma Democrat*, *Yreka Journal*, *San Diego Union*, *Eureka Standard*, *Chico Chronicle-Record*, *Woodland Mail*, *Ukiah Dispatch-Democrat*, *Santa Barbara Independent*, *Downville Mountain Messenger*, *Amador Ledger*, *Santa Cruz Blade*, *Visalia Times*, *Sutter County Farmer*, *Boodie Miner*, *Marysville Democrat*, *Los Angeles Herald*, *Vallejo Chronicle*, *Redding Free Press*, *Sacramento Record-Union*, *Sacramento Bee*, *Sacramento News*, *Calaveras Chronicle*, *Sonoma Index-Tribune*, *Winters Express*, *Truckee Republican*, *Williams Farmer*, *Riverside Press*, *Placer Herald*, *Petaluma Argus*, *Weeky Orange Post*, *Paso Robles Independent*, *Los Angeles Express*, *Willits News*, *Monrovia Messenger*, *Sacramento Wonder*, *Ione Valley Echo*—in all 56.

The list for San Jose is as follows: *Gilroy Gazette*, *Watsonville Rustler*, *Haywards Journal*, *Downey Champion*, *Antioch Ledger*, *Santa Cruz Sentinel*, *Oakland Times*, *San Jose Times*, *San Jose Record*, *Alameda Argus*, *Petaluma Courier*, *Napa Register*, *Hollister Free Lance*, *Grass Valley Tidings*, *Inyo Independent*, *Stockton Mail*, *Ventura Democrat*, *Salinas Index*, *San Bernardino Times-Index*, *Modesto Herald*, *Los Angeles Times*, *San Luis Obispo Tribune*, *San Jose Mercury*, *Santa Rosa Republican*, *Redwood City Democrat*, *Lakeport News*, *Marin Journal*, *San Mateo Leader*, *Redwood City Times*, *Santa Monica Graphic*, *Gilroy Advocate*, *Ventura Free Press*, *Madera Mercury*, *Mountain View Register*, *Watsonville Transcript*, *Arroyo Grande Herald*, *Pleasanton Times*, *Paso Robles Moon*, *Banning Herald*, *Arcata Union*, *Lompoc Record*, *Sierra Valley Leader*, *Kern County Californian*, *Santa Clara Journal*, *Eureka Times*, *West Coast Alliance*, *Vacaville Reporter*, *San Bernardino Courier*, *Santa Cruz Record*—in all 48. It is a notable fact that not one of the great San Francisco dailies has taken sides either way. *The Chronicle*, the *Bulletin*, the *Post* and the *Report* have said nothing at all editorially. The *Examiner*, while not espousing either side of the issue, has simply remarked that it was a great question, and that it should be determined on more important considerations than mere personal resentment on the part of legislative representatives.

ARTICLES have been signed which necessitate the immediate construction of the Donner & Lake Tahoe Railroad. Contracts for grading, getting out ties and building the road will be let in a few days, and from ten to fifteen thousand dollars will be paid out to Truckee workmen in time for their Fourth of July celebration. And these figures denote only the beginning! The iron, equipments, rolling-stock and, in fact, everything but the ties, grading and laying the track, are now ready for the first ten miles of road, and for that distance the road must be completed by the 15th day of July. Only one of the corporations builds the road, but the other furnishes the work which will make it one of the best paying little railroads in the State. Over one hundred million feet of saw-logs are to be hauled over the line in the next ten years. All these logs now stand in the vast forests owned by the Truckee Lumber Co. between Truckee and Lake Tahoe. When they have been cut and hauled and dumped in the upper millpond of the Truckee Lumber Co., they will have to be sawed and manufactured into lumber, boxes, furniture, doors, sashes, blinds and other merchantable articles. Some idea of the magnitude of the operations contemplated and of their importance to Truckee may be gleaned from these statements and the fact that the mammoth factory of the Truckee Lumber Co. will run day and night, winter and summer.

THE most successful artesian well ever sunk on the Colorado desert has been made by the Southern Pacific people on the line of their road at Walters station, which is 195 feet below the level of the sea and 106 miles west of Yuma, the well is 483 feet deep and it has a flow of 23,000 gallons every twenty-four hours. It is thought the water enters the well at the 400-foot depth, and the stream has a force sufficient to raise the water height of twenty-four feet into a large tank by the side of the road. It is fresh cool water, almost clear, and comes, it is thought, from the distant mountains, underneath a heavy stratum of clay that is found under that salty depressed region of the desert. There has been some little water found at the station heretofore, but only a very limited quantity, and until the discovery of this "banner well," as Mr. Curtis calls it, the prospects of a water supply between Indio and Yuma were very poor.

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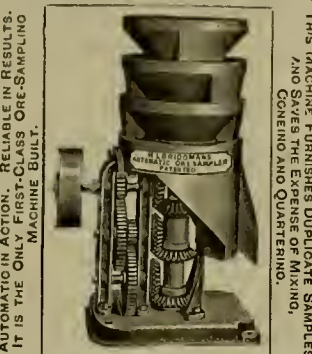
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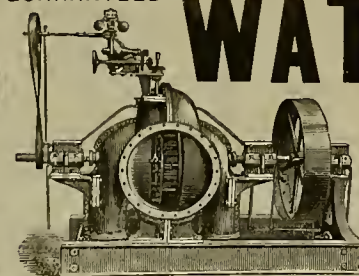


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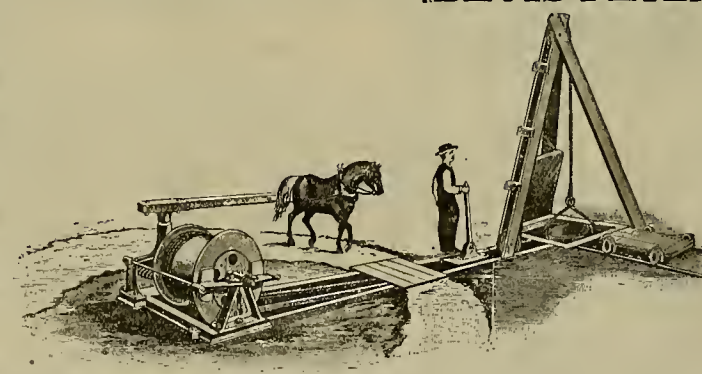
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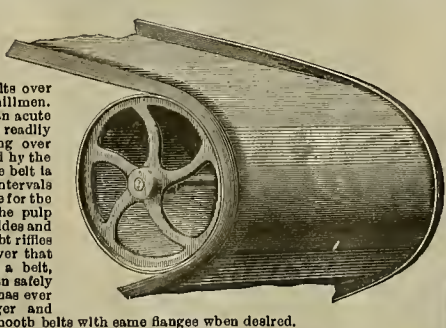
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Mechanical Progress.

Quicksand, the Bane of Builders.

Mr. Roht. L. Harris, of the Am. Soc. C. E., in the course of a lecture before the Engineering Section of the School of Mines, Columbia College, remarked:

Quicksand is a bane of engineers and bunders. It has sunk millions of capital, and has caused the abandonment of extensive enterprises. I had known from observation that fine quicksand is widely scattered, but had no idea until recently that it is so extensively distributed. During the past six months I have received complaints of it from Puget Sound to Maine, and between the Gulf of Mexico and Canada, from the interior as well as near the great bodies of water. As cities build deeper, and municipal improvements go deeper still, we learn more of what is beneath than when our works were nearer the surface. The process of which I speak is proposed for upward of 20 engineering superstructures located in 15 different States.

Upon some important work in Providence, R. I., an intercepting sewer, 6 to 8 feet in diameter, a halt had been called on account of the quicksand encountered. The contractors for the worst sections claimed that it was ruinous for them to proceed and had petitioned the City Council to release them from their contracts and cancel their bonds, which was subsequently done. Nearly all the work and trials had been made by the usual methods of sheeting, excavating and pumping out, reducing the water level. These resulted in the sinking of considerable tracts of the original surface 4 to 5 feet, carrying down forest trees, building materials, etc. Experience prompted me to consider the reverse of these processes, that of pumping in material which should solidify the troublesome quicksand in place, while in its normal condition and before injurious sub-currents should be established, in fact to make it its own protector. The problem was separated into three divisions, which, as they represented unknown quantities to be obtained, we will designate by the algebraic characters, x , y , z . These were then, x , to find a cementing substance, fluid or otherwise, that should unite with and solidify this extremely fine and light, yet compact and hard quicksand; y , to form channels and chambers at any depth under ground, and of desired form, without extensive disturbance of the surface or the neighboring materials; z , to fill such chamber and permeate the interstices of the adjacent materials with the cementing substance x . The divisions y and z comprised a pretty riddle. It was to put a fluid, say, 40 feet into the earth and below water level in such a way that it shall mix with the material there for a defined area of, say, 12 x 30 feet, and solidify the same, so that if an excavation is made a month or a century hence, that floor will be found as you now determine; or, if you prefer, let it be a Cardiff giant or any remains of prehistoric cities.

Could a cementing fluid be forced through and into fine sand at a depth below the surface? Would it remain in a cavity already filled with incompressible water? Would it harden sufficiently within reasonable time under the buried conditions and in predetermined shape? Could the pipes be used and removed without being clogged or made useless? A trial was made on the work during the second week in March and in freezing weather, as bad as any experienced during the winter. The answers to the queries suggested were satisfactory. The results, despite the adverse circumstances, were successful, and fully demonstrated the method, and that it would be under complete control. The engineers and contractors of the work promptly and cordially expressed their satisfaction with the trial and their confidence in the new method.

The result is that x , y and z are determined both theoretically and practically. The ultimate results should be far reaching and of great benefit. The method is applicable not only to quicksands but to other sands and the finer earthy materials. The applications are innumerable, enabling engineers and builders to make constructions in many of the fine, loose or soft materials, largely of the substances themselves, at any depth below the surface or of the adjoining material, as for example, shafts, tunnels bridge foundation or canal repairs, water works, sewers, harbors, shore protections, jetties, buildings, etc., and, perhaps, there may be found herein the solution of a difficult problem in rapid transit for cities.

MECHANICAL STRUCTURE OF A TREE. When a man is disposed to plume himself upon his mechanical ability, let him go out and look at a tree, and then he will conclude that he is not so much of a mechanic in any

event. His clumsy pumps with their palpable valves and his rickety bridges with their members stuck together with rivets are put to shame by the wonderful structure of a tree, which draws water ten times farther than man can draw it, and supports loads by the single attachment of a branch to a trunk, which no bridge ever made by man could carry one instant upon the same section. More than this, the tree takes in a gas poisonous to human life—carbonic acid—and charges it into the essence of all life—oxygen—but it is chiefly in its mechanical structure that it makes the proudest engineer humble when he looks at it.

How to Rig the Indicator.

In using the steam engine indicator, select some reducing motion with as few joints and as little complication of parts as possible. In a number of works on indicator practice which I have examined, the manipulation of the instrument and the working of the engine is placed before the reader with much minuteness. The reducing of the stroke of the piston to that of the desired length seems to me to be somewhat slighted, or passed over with less attention than this subject warrants. A chance for error and much annoyance is experienced by unskillful or careless handling of a reducing rig.

The principal use of the indicator for the working engineer is to guide him in the adjustment or setting of his valve gear. The instrument should be applied at least once a week, and some rig for reducing the motion of the piston should be selected which will admit of easy attachment without stopping the engine. In visiting engine-rooms in my locality I have seen several different rigs which are approximately correct, and of sufficient merit to warrant a reproduction of some sketches descriptive of them.

A neat arrangement consists of a light brass wheel which has two diameters, the larger diameter being of such dimensions that the circumference will be one-half the stroke of the engine, and the smaller having a circumference one-half the length of the diagram. A cord wound two or three times around the large wheel is attached to the cross-head, and a cord from the wheel of smaller diameter leads to the harrel of the indicator when in operation, or is hooked to an idler cord which passes over a leading pulley to a weight while the indicator is at rest. A clock-spring attached to the side of the wheel causes the return motion after the cord has been drawn out by the moving cross-head. This rig is a permanent attachment to the front head of an engine I have in mind, is in regular use, and is giving satisfaction. I fitted up one of these wheels at a total cost of three dollars.

If there are several feet of space between the walls of your engine and the engine-bed a rig may be fitted quickly and without cost. Procure a stick of half-inch hard wood an inch and a half wide, and from two to three times the length of the stroke of the engine. To one end of the stick fix a slotted piece of iron, which is intended to be driven by a stud on the cross-head. On the other end of the stick attach a piece of iron with a hole drilled in it for a half-inch pin to work in. Make the pin fast in an angle-plate attached to the wall. The cord from the indicator barrel must lead at a right angle to the line of cylinder, changing its direction by leading around a small pulley and to a peg placed at a proper distance on the wall end of the stick.—M. Cable in Power.

Where Anchors Are Made.

"The little town of Camden, Me., ought to have its name changed to Hope," said a dealer in ship supplies and stores, "for it turns out more of the emblems of hope than all the other places in this country combined. All of the stately ships that come out of the Maine shipyards look to that little village on the Penobscot for their anchors. Scores of sturdy smiths swing their hammers day after day all the year long in the black, smoky, long, low Camden shops, where only anchors are forged.

"Sometimes the triphammers are going all night about the forges, and the blazing of the fires and the ring of the hammers are seen and heard for miles away. Thousands of tons of old iron are purchased by these queer establishments every year, for anchors are forged largely from cast-off iron. The material is cut into small pieces by great shears that clip through the iron as easily as a cheese-knife slices a cheese. The pieces are bound into bundles by strong wires, and are then fused in the forges. Then they are pounded and welded into the various parts of the anchor, some workmen fashioning the rings, others shaping the flukes, others hammering out the palms

and others forging the shanks. Then the completers take the different parts and fuse and weld them into the finished anchor. Anchors of all sizes and weights are turned out from the noisy shops of Camden, the graceful little pleasure-boat anchor, weighing but a few pounds, as well as the great 50,000 and 75,000-pound anchors of the biggest ships.

"There are many interesting relics at Camden in the line of rusty and broken anchors that did duty in their day on famous merchant vessels, historic warships and sturdy whalers. What is left of the anchor of the United States frigate Cumberland is among these relics."—New York Sun.

Scientific Progress.

Work at High Altitudes.

Some practical facts are furnished by the experience of the workmen engaged in the construction of the new Central railway over the mountains in Peru. The line starts at Lima, in altitude 12 degrees. The summit tunnel of this line at Galeria is at the height of 15,645 feet, or a little under the height of Mont Blanc, but it must be remembered that the climatic conditions are very different and more unfavorable in Peru than in Europe. Mr. E. Lane, the engineer in chief, finds that the workmen, up to an altitude of 800 to 10,000 feet, do about the same relative quantity of work as at the sea level, provided they have been inured to the height or brought up in the country. At 12,000 feet the amount of work deteriorates, and at 14,000 to 16,000 feet a full third has to be deducted from the amount that the same men could perform at sea level.

Owing to the absence of malaria the percentage of efficient labor at the greatest elevation is a very high one. Men coming from the coast are not found capable of doing efficient work for about two weeks on an average when taken to high elevations. The capacity gradually increases and reaches its maximum in a few weeks or months, according to the constitution of the individual. The majority of the laborers are "Cholos," or Indians born in the Sierra. They are found incapable of doing efficient work on the coasts or in the warmer altitudes without a long course of acclimatization. If gangs of these "Cholos" have for special purposes been taken suddenly down from the Sierra to work at altitudes of from 2000 to 5000 feet, sickness and fever have resulted from the change.

Mules and horses are found to do about the same efficient work proportionately as human beings up to about 17,000 feet in this district. Mules stand the climate best, but, again, require some weeks for acclimatization, and if urged to undue exertion at great altitudes they are liable to drop dead suddenly. It may be remarked that the region of perpetual snow in the district begins at about 18,000 feet.—Nineteenth Century.

Power of the Air.

The magnitude of the store of aerial energy, upon which mankind may draw so long as the race exists upon this earth, is beyond the reach of imagination to conceive, but not beyond the power of computation of the mathematician. Taking the quantities roughly and in "round numbers," the atmosphere weighs about a ton to every square foot of the earth's surface; 25,000,000 tons per square mile, or 5,000,000,000,000,000 tons on the total of 200,000,000 square miles.

Its energy is that due to the motion of this inconceivable mass, at velocities varying all the way from the gentlest zephyr to the hurricane and the cyclone, rushing over the prairie or along the surface of the sea at more than 100 miles an hour. A cubic mile of air weighs about 10,000,000,000 pounds, and, at the rate of motion of the cyclone, develops 4,000,000,000,000 "foot-tons" of energy, and, if all employed at this rate for the performance of work, useful or destructive, this 8,000,000,000,000 "foot-pounds" would be equivalent to more than 2,000,000,000,000,000-horse power.

If the disturbance reaches the exterior of the atmospheric shell enclosing the earth, it embodies 10,000,000,000,000,000-horse power, or millions of times as much as the highest estimates make the probable whole steam power of the world at the end of the 19th century.

Assuming the moderate velocity of 16.7 miles an hour for the whole atmosphere of the globe, its energy per mile is 1.36 of that just computed, and 5,000,000,000,000,000 tons of atmosphere would represent about 50,000,000,000,000,000 foot-tons of energy and not far from 50,000,000,000,000-horse power, certainly more than a half-million times as much power as have all the engines

in the world combined. Each cubic mile would store 40,000,000,000-horse power, and every square mile, could 110 feet of its superincumbent atmosphere be utilized, would yield about 80,000,000-horse power, which is not far from the aggregate of the existing steam power of the world.—Engineering Magazine.

LOAD TO SQUARE FOOT.—The load which is produced by a dense crowd of persons is generally taken at 80 to 100 pounds per square foot, and is considered to be the greatest uniformly distributed load for which a floor need be proportioned. That this value may be largely exceeded in an actual crowd was pointed out by Prof. W. C. Kernot, of Melbourne University, Australia, in a recent paper before the Victorian Institute of Engineers. In an actual trial, a class of students averaging 153.5 pounds each in weight were crowded in a lobby containing 18.23 square feet, making an average floor load of 134.7 pounds. There was still room to have placed another man, which would have brought up the loading to 143.1 pounds per square foot. Professor Kernot also quoted from Stoney, who placed 58 Irish laborers, averaging 145 pounds each in weight, in an empty ship deck-house measuring 57 square feet floor area. This was a load of 147.4 pounds per square foot. In another test, with 73 laborers crowded into a hut, 9 feet by 8 feet 8 inches, Stoney produced a load of 142 pounds per square foot, and estimated that two or three more men could have been squeezed in. It appears from these experiments that, while the figures ordinarily assumed of 80 to 100 pounds are sufficiently correct for spaces on which there is no cause to induce the collection of great crowds, larger figures, say 140 or 150 pounds per square foot, should be used for railway stations and platforms, entrances and exits to places of public assemblies, or of office buildings, bridge sidewalks, pavements over vaults, and other places where dense crowds are likely to gather.—Engineering News.

ENAMELS.—Of enamels there are two sorts, entirely distinct. The first are the incrustated enamels and the second are the painted enamels. Enameling consists in applying to a metal surface a powder composed of pounded silice, or to put it in the simplest form, of glass colored with metallic oxides and then fixed by fire. Thus it is obvious that the transition was easy from letting colored glass into gold or silver settings to melting the glass into its place so that it adhered at the back. The earliest enamels tell their own story. They are "cloisonne"—that is to say, precisely as jewels were set in a framework of metal, so frameworks of metal were fashioned to contain the glass melted into these cells. This was the construction of "cloisonne" enamel. First of all, a fine band of gold was soldered on to the base, standing up from it at right angles and contorted to form an outline such as was desired to be given to the ornamentation. If green was to be the color for leaves, then each leaf was formed of the band, and closed to contain the green. Each petal of a red rose would, in like manner, be enclosed so as to form a gold pocket, in which the red paste would be melted into glass. Specimens of "cloisonne" enamel of European manufacture are rare. The Louvre collection comprises hardly more than one example, but that is a magnificent one—the cover of a book of the Gospels. Chambers' Journal.

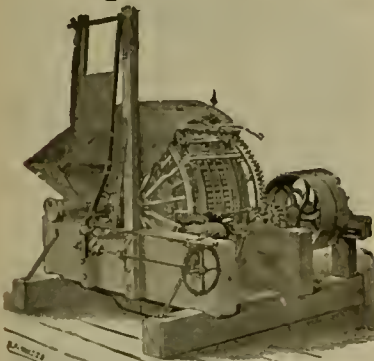
SODIUM PEROXIDE.—This compound has been brought into commerce for use as a bleaching agent. It has the appearance of a yellowish, pulverulent, or partially aggregated mass, very readily soluble in water and hygroscopic. In contact with water heat is evolved and oxygen disengaged, which excites coughing. Dilute acids give rise to the formation of hydrogen peroxide, but its decomposition must be prevented by cooling the liquid. Sodium peroxide may be handled without danger, but some caution is necessary in bringing it into contact with organic substances. It may be heated with dry aniline or benzene without risk, but when water is added to the mixture with benzene it takes fire with a kind of explosion. As compared with 1.5 per cent hydrogen peroxide (= 12 per cent by volume), sodium peroxide contains 20 per cent of active oxygen, and it has the advantage, as a solid material, of being more convenient for transport. It is also more capable of being kept, without alteration, than hydrogen peroxide. For convenience in use it is mixed with magnesium salts, and a material of this nature is made under the name of "oxygen powder." In using it or sodium peroxide care must always be taken to mix with water in very small proportions at a time and to prevent rise of temperature.—Pharm. Centralb.

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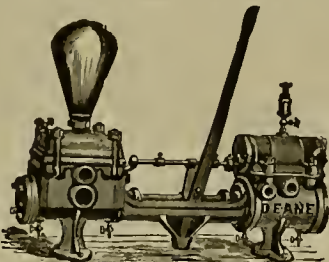
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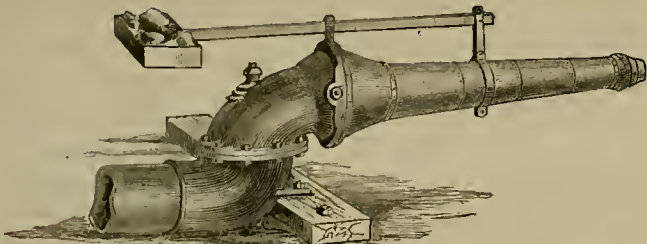
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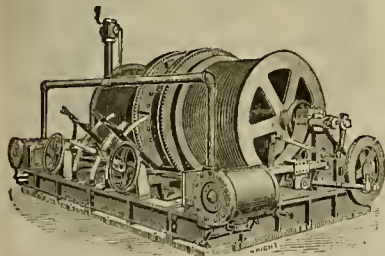
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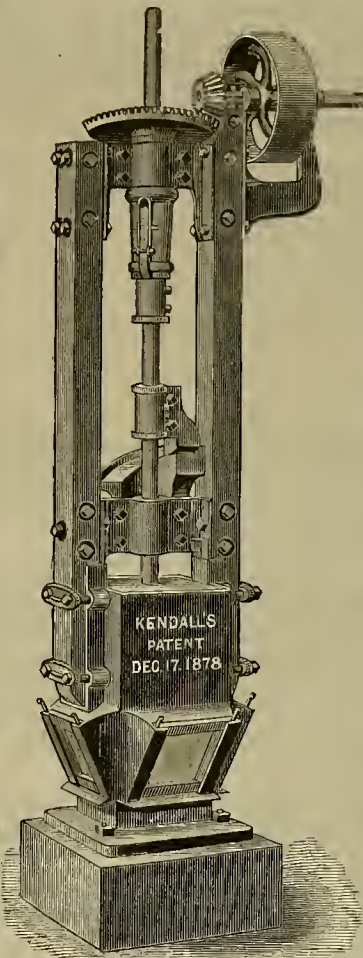
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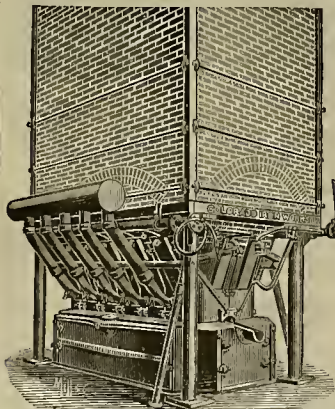
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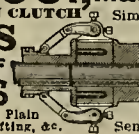
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When the British bombarded Alexandria the search-lights on the vessels composing the squadron served not only to make the harbor as light as day on the darkest night, but enabled the admiral to observe the operations of the enemy on shore in the construction of batteries and earthworks, thus placing the Egyptians at a decided disadvantage.

It will enable a vessel to engage the enemy at night to almost as good advantage as during the day. It is useful in chasing a flying enemy and in conducting the management of a fleet. The assistance it gives in reconnoitering a coast will be readily appreciated. Difficult movements, such as entering a tortuous channel by night, passing between the vessels in a crowded harbor, and making a landing when the saving of time is of supreme importance, are all rendered comparatively easy by the search-light.

The search-lights of the British squadron at Gibraltar were the means of saving hundreds of lives when a merchant steamer sank in that harbor a few months ago. An effective search-light will make it almost as difficult for a torpedo boat to reach a warship by night as it is by day. Indeed, so difficult does it render the attempt that it has now been decided that the torpedo vessel and everything belonging to it, even to the faces of the men, must be painted black to avoid discovery.—N. Y. Advertiser.

ORNAMENTING BY ELECTRICITY.—The ornamenting of glassware by the application of electricity is being developed in a practical way in Philadelphia. It is the application of an old device to a new use. The tool used for engraving upon glass consists of a brass tube lightly packed with shredded asbestos and through which pass two conductors which terminate in two hindling posts. Projecting from the end of the brass tube is a pointed piece of slate, against which rests a piece of platinum wire, whose ends are fastened to the binding posts. Through the large tube is a smaller brass tube extending to the bottom, permitting of a flow of cool water which goes through the handle and passes off through another tube. A current of 50 amperes and five volts is sent through the platinum wire, which is heated to incandescence. The pointed slate pencil supports the wire and permits of a moderate pressure being applied to the point without injuring the wire. The operator holds in one hand the object to be engraved upon, and, in the other hand, the tool with which he writes. The film of red-colored glass upon the outside is so thin that the least scratch will expose clear glass, and all marks thus made upon the surface stand out transparent against a red ground. The principle upon which it works is as follows: The heated platinum wire, as it touches the glass, causes the part immediately underneath to expand and chip off from the body.

AUTOMATIC ENERGY AND CONTROL, as developed in the big power plant of the World's Fair, will be as complete and finished an example of mechanical progress as modern skill can supply, says the *Age of Steel*. The boilers in the plant are supplied with burners for oil, the valves connected by electricity with the pressure gauge, so that a rise in the pressure of steam decreases the flame of the burners. The demand for oil is indicated automatically at the oil tanks, and supplied by the opening of electrically connected valves in the tanks and oil pumps. The supply of water is regulated in the same way, while in addition each engine has a duplex signal which rings an alarm when the steam or water rises or falls to the danger point. This automatic manipulation very aptly illustrates modern progress in labor-saving mechanisms.

The electric light is rapidly winning its way into popularity. The English custom-house authorities talk of using it when searching for contraband goods on vessels carrying explosives, and so reducing the danger of explosion. The Irish Cattle-Traders' and Stock-Owners' Association, of Dublin, is said to be agitating for an extension of the facilities for veterinary inspection by electric light. Such facilities are afforded in the port of Cork, and should, they

consider, be afforded in other ports that are largely used in the shipment of cattle. A novel use of electricity as an illuminant is an electric bicycle-lamp, which is said to give a brilliant, intense and steady light. The lamp is connected to the battery by a cord with a plug at the end, which fits into the terminals of the cells. The accumulator is contained in a leather bag secured in place by straps. The light can be turned on or off while the bicycle is at full speed by means of a switch at the bottom of the lantern. The lamp is so arranged that it can be detached in a short time, and without much trouble. And if it is true that the policemen in certain parts of London have recently been supplied with incandescent lamps, instead of the clumsy and dirty dark lantern, we commend the civilization of the authorities in those parts.—Invention, of London.

THE purification of starch of an inferior quality by an electric process has been found so effective that the starch so treated is superior to that formerly known as the first quality, and is sold for a higher price than the latter. The manufacturers of starch who adopted this process are quoted as saying that in the first year of its operation the plant paid about three times its value by the saving in expense of operation over the old method.

A NUMBER of electric clocks are to be erected in Vienna by a company which has been formed there with that object. The pillars that support the clocks are to be utilized for advertising purposes, and will be the source of the company's revenue.

Useful Information.

Sick Headache.

Attacks of sick headache could often be avoided if the cause of them were known. In many instances the cause is a disordered condition of the stomach. In such cases there is often a regular recurrence of the attacks, the person in the meantime feeling perfectly free from the complaint.

Here it will often be found that by some error of diet the patient is gradually accumulating in his system some noxious substances, which it takes a special effort of nature to throw off. Then the whole internal machinery refuses to do its ordinary work. The stomach, the intestines, the liver and other organs which produce the digestive juices almost entirely cease their regular task of rendering the food taken into the mouth fit for absorption into the system at large.

Sometimes habitual overeating will produce this result. Or a person who has been constantly active may continue to eat his usual amount of food after exchanging his occupation for some more sedentary one. In either case the result is the same; the overburdened organs become partially paralyzed, the undigested food acts as an irritant, and headache and general disorder in the digestive tract prevail.

A person who has no symptoms of stomach disorder, or who has been taught by his physician to avoid indiscretions which formerly resulted in trouble, and who still has regularly recurrent attacks of sick headache, must look to some other than these, the most common causes of such attacks.

One not uncommon cause of sick headache is irregularity of the cornea or some other eye derangement. The skillful oculist will be able to detect any such irregularity, and to judge whether or not it is sufficient to cause the trouble.

Sick headache is very apt to occur in school-children from leaning forward over books, from imperfect digestion, or from too little exercise in the open air, and not infrequently from a combination of these unhygienic conditions. A child who suffers from sick headaches should be promptly relieved from such unwholesome influences.—Youth's Companion.

The Sun and the Stars.

The sun is a star, and the stars are suns. This fact has been a familiar one to astronomers for many years. That the stars shine by their own inherent light and not by light reflected from another body, like the planets of the solar system, may be easily proved.

That many of them at least are very similar to our own sun is clearly shown by several considerations.

Three facts prove this conclusively. First, their great intrinsic brilliancy, compared with their small apparent diameter, a diameter so small that the highest powers of the largest telescope fail to show them as

anything but mere points of light without measurable magnitude.

Second, their vast distance from the earth, a distance so great that the diameter of the earth's orbit dwindles almost to a point in comparison. This accounts satisfactorily for the first fact. Third, the spectroscopy—that unerring instrument of modern research—shows that the light emitted by many of them is very similar to that radiated by the sun.

Their chemical and physical constitution is therefore, probably analogous to that of our central luminary. The red stars certainly show spectra differing considerably from the solar spectrum, but these objects are comparatively rare, and may, perhaps, be considered as forming exceptions to the general rule.—Gentleman's Magazine.

Where Horses Ride.

Ontario, Cal., has a street railway that is operated by horse-power and partly by gravity. When the town was founded an avenue 200 feet wide was laid out with space in the center for a street-car line. The avenue is six miles long, running from the town of Ontario to the mountains with a steady ascent varying from 100 to 250 feet to the mile. In December, 1888, the railroad was completed and horse cars put on. A couple of ingenious mechanics, J. B. Tays and James Birch, decided that the horses might as well ride on the down trip, and accordingly designed a small platform car, which slides under the main car, for the descent. On this the horses ride down, the car running by gravity. The arrangement has been in successful use since March, 1889. The down trip is regularly made in 30 minutes, but the cars sometimes come down in half that time without stops.

Another Use for the Onion.

A very convenient mucilage can be made of onion juice by any one who wishes to use it. A good-sized Spanish onion, after being boiled a short time, will yield, on being pressed, quite a large quantity of very adhesive fluid. This is used quite extensively in various trades for pasting paper on tin or zinc, or even glass, and the tenacity with which it holds would surprise any one on making the first attempt. It is the cheapest and best mucilage for such purposes, and answers just as well as many of the more costly and patent cements. Some of the cements sold by street fakirs at 10 cents a bottle consist of nothing but onion juice and water, and the bottle and cork cost a great deal more than the contents.

CLOTH THAT STOPS BULLETS.—The cloth cuirass invented by Mannheim, a tailor, to resist the small-caliber bullet, and recently approved by the War Department, was tested at Mannheim. Uniforms of the new cloth placed on wooden effigies were not pierced by balls fired from points of 100, 200 or 300 meters distant. At shorter range the wooden figures were so deeply dented that the officers concluded the force of the impact was sufficient to stun a man. To make the cuirass, the tailor probably applies a secret preparation to an ordinary cloth tunic. The prepared tunic weighs six pounds. The prepared cloth could not be used to protect the arms and legs, as it would hamper the movements of a soldier.

20-Stamp Mill for Sale.

In Southern California, a 20-stamp Gold Quartz Mill, with engine, boiler, self-feeders, rock-breaker, etc. As the premises are adjacent to Railroad, the Mill could be conveniently removed. Can be had at low price for cash. Address "Quartz Mill," care MINING AND SCIENTIFIC PRESS, San Francisco.

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The works are situated at Daggett, Cal., in the Calico Mining District, and on side track of the Atlantic & Pacific Railroad. They contain a first-class 60-horsepower engine and 46-horsepower boiler with Ore-crusher and other machinery, Mill scales, Assaying outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to JOHN H. GILLESPIE, 1814 Stockton St., San Francisco.

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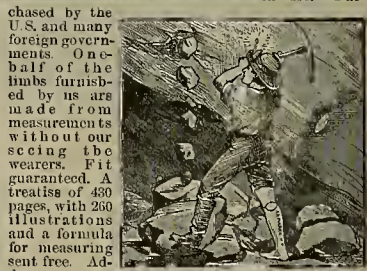
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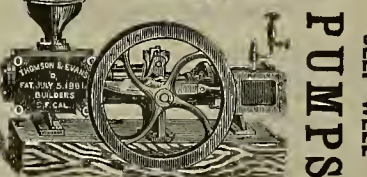
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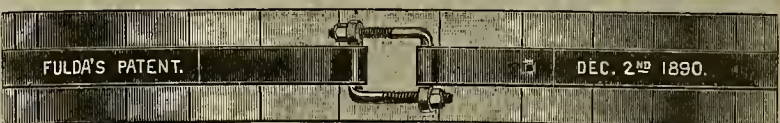
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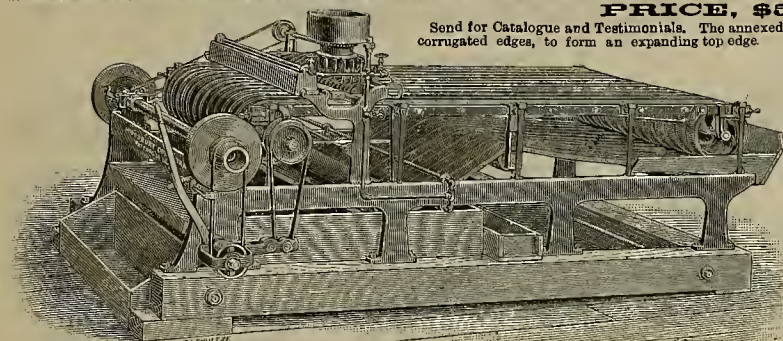
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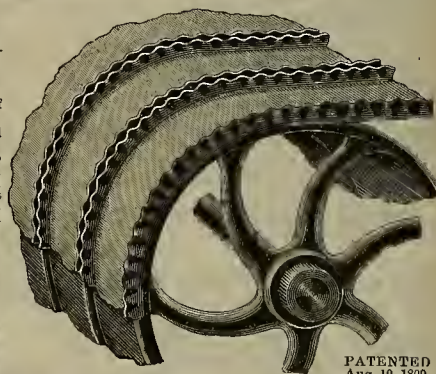
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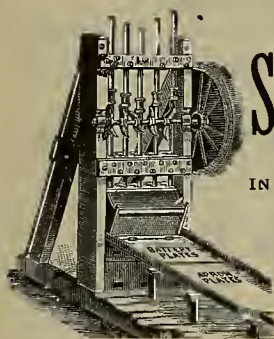


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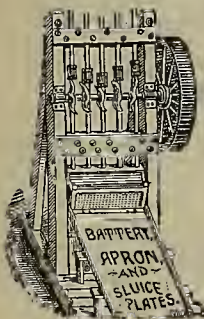
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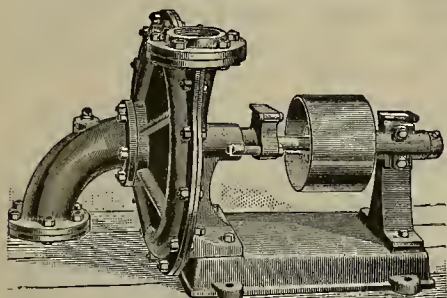
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PIONEER DISTRICT.—*Record*, March 23: Pioneer and vicinity begins to loom up once more like an Iowa cornfield in a cyclone. There have been several new developments of late and among the principal ones is the Bowman-Zumalt mine. This mine is worked through a tunnel some 200 feet in length and they have opened up a ledge of high-grade ore. The happy owners have just pocketed \$900. The proceeds from about 70 tons of ore. The Loretta, another new discovery, is owned by John Wexley and Joseph Dilly. This mine at present ranks among the chiefs of the district. The ledge is well defined and bears every indication of being a permanent vein. They have out about 15 tons of ore that prospects all the way from \$60 to \$150 a ton. At the Irma mine the shaft is down something over 200 feet and at present they are running levels. They have some very fine looking ore and it is quite evident that the stockholders will be handsomely reimbursed for their outlay, push and energy. John Harker, Jr., has struck a very promising mine. The ore will pay about \$30 a ton. This young man deserves a great deal of credit. He is home from school on a vacation, and instead of sitting down he pulled off his coat and went to work and developed a fine looking ledge. James Toop has bonded his mine to David Fisher, who contemplates putting on a full force of men in the early future. This is a large vein and should it prove to be a paying one it will be something more than an ordinary mine for this section and also a valuable piece of property. Albert Kimball is reopening the old Soto mine. In early days this mine was worked and proved to be rich. No doubt with proper handling it will take its place once more on the list of paying mines. The Pinevetta has outabout ten tons of medium ore on the dump. At the Amador View mine there is considerable good ore in sight and with flattering prospects for a valuable mine. This mine has not been worked steadily this winter.

RICH POCKET.—*Calaveras Chronicle*, March 22: We have been informed that a pocket was struck in the "Roaring Gimplet" mine on the Amador side of Mokelumne river, just above Big Bar, from which \$1200 was taken out one day last week.

WILDMAN.—*Amador Record*, March 22: Last evening at the Wildman mine James Littlecot narrowly escaped death. He was standing on the ladder at the 900-level unscrewing a joint of water pipe near at hand. His efforts apparently moved the whole pumping apparatus and unscrewed a joint nearly 200 feet above him and the whole thing went crashing down to the 1100 level. In the descent it knocked Mr. Littlecot from the ladder, but he managed to catch hold of the timbers 25 feet below, thus saving himself from a terrible death. In all the history of its working there has never been a fatal accident in the Wildman mine. This exemption may be called luck by some, but as one of the miners said, it is the perfect system down to the minutest detail inaugurated in the mine by the superintendent, which causes that luck to be the perfection of safety to the men.

INCREASED ACTIVITY.—*Amador Ledger*, March 25: It has been well known and currently reported on our streets for several months that S. H. Howland, formerly of the Hardenberg or Casco mine, near the river, carried with him to Boston an option on the Gwinn mine, located in the Gwinn canyon, in Calaveras county, about a mile from Middle Bar, and at present owned by a son of ex-Senator "Duke" Gwinn. This mine has already turned out a vast quantity of gold, and there seems to be no doubt in the minds of those familiar with it that, if properly conducted, it will prove to be one of the best paying mines in the State. The ore was very rich in most of the levels, especially in the 700, 800 and 1300. The shaft was down 1500 feet, with levels run from 300 to 400 feet from the stations. Mr. Howland went direct from here to Boston to see his folks and to present the proposition of reopening the property to a number of Boston capitalists with whom he had done business in the past. They seem to have been favorably impressed with the proposition, for he writes that he will be upon the ground in a short time to reopen the shaft and levels, construct a hoist, erect a mill and go to crushing at least 100 tons of rock per day. This enterprise, if it turns out as Mr. Howland expects, will prove of vast benefit to Jackson, as it will employ many Jackson miners, and much of the trade will come this way.

BLAZING STAR.—The Blazing Star, located a mile from West Point, is about to resume operations. The owners are putting in an electric plant for the purpose of reducing their ores, which is a new thing in this State, and will be watched with a great deal of interest by all miners, and more especially by those in districts where rebellious ores are encountered.

WILL OPEN AN OLD MINE.—W. D. Chambers has secured a mining property from Ginochio Bros., which is located near the Mokelumne river. The claim was worked many years ago with good results. Mr. Chambers will, as soon as the weather permits, proceed with the development of the property.

EIGHTY-DOLLAR ROCK.—Henry Zumalt is developing a claim in the Pioneer district which is proving to be a bonanza in a small way. The property was worked many years ago on the surface, and was very rich; then the owner tried to find the ledge lower down by driving a tunnel, but missed it. Zumalt, a short time ago, had better luck and found the ledge. A few weeks ago he had ten tons of ore crushed

in Sydney James' mill, and it netted him, above the expenses of hauling and crushing, \$80 per ton. He has two shifts at work getting out the rock, which he will haul to the mill as soon as the weather will permit. He estimates 100 tons in sight, all the same quality of rock as that which yielded \$80 per ton.

MISCELLANEOUS NOTES.—The Hardenberg people have got through the cave in that mine and found that but one set of timbers had fallen. This was repaired. The water is being pumped out, and in a few weeks they will be sinking in the shaft. The Zsile people were compelled to move their water pipe in a great hurry to prevent its being washed down the south branch from the place where it was put to "set" after being tarred during the recent storm. The bank upon which it rested was entirely washed away. The men at work in the Irma, in Pioneer district, were driven out of the mine on Monday by the water from the creek, which completely flooded the mine by running down the shaft. As soon as the water in the creek falls, a few days' pumping will suffice to get the water out of the way. The Albany, the Littlefield and the Astoria tunnels are being extended as rapidly as possible with one shift of miners at each place. At the Littlefield the superintendent says that he expects to cut the vein at a very early date, tapping it about 100 feet from the surface. This vein is very prominently exposed on the surface and shows good milling prospects. At the Ivanhoe, in Plymouth district, the Messrs. Wheeler are running a five-stamp mill and crushing about 12 tons of ore in 24 hours, which yields from \$3 to \$5 a ton. They are hoisting about 70 feet with a whim. They are running levels now at that depth.

FROM OLETA.—*Cor. Amador Dispatch*, March 25: The old Ben Bacon gravel claim on American Hill, that has been worked for the last four months by D. Townson, J. Neff and others, is turning out some very fine gravel—20 and 25 cents to the pan is considered small. We are satisfied that there are a number of so-called worked-out gravel claims in this vicinity that are now laying idle that would pay well if properly handled; but many of the owners are not what could be called prospectors.

Calaveras.

AT WEST POINT.—*Calaveras Chronicle*, March 22: The Blazing Star mine has started up with a small crew, but it is expecting to increase soon. The Lone Star has laid off a number of its force.

Inyo.

BORAX OPERATIONS.—*Index*, March 22: M. H. Bush, of Alvord, was in town on Monday. He reports an accumulation of 1400 sacks of borax at Conn & Trudo's works, in Saline valley, owing to a blockade of the wagon-road over the mountains, occasioned by the storms of the winter. The road will soon be repaired and hauling commence. Bush and his partners are making 16 sacks of borax per day at a marsh in Nye county, Nevada, about 10 miles from the California State-line. This will be hauled to Alvord, a distance of 94 miles, and shipped by rail.

Nevada.

GOON DIVIDEND.—*Grass Valley Telegraph*, March 26: The North Star Mining Co. has declared dividend No. 8, payable on March 20, 1893. The dividend was 50 cents per share. There are 100,000 shares in the mine and this No. 8 dividend makes \$400,000 declared. That is a mighty good showing for a mine which not a great many years ago, was supposed to be worked out. The North Star is destined for a long life yet, and it is being most ably managed by Supt. Abadie.

GRIZZLY RIDGE MINE.—*Grass Valley Telegraph*, March 25: This afternoon Peter McAusland was in town. He is the owner of the Grizzly Ridge mine, said mine being situated near Columbia Hill, in this county. Mr. McAusland brought down with him some of the very best kind of ore from his mine, and there were very many old miners who saw it and would talk among themselves, and we heard many of them say: "You bet your life that's good rock."

Placer.

BIG DIPPER MINE.—*Grass Valley Telegraph*, March 22: Charley Smith has just returned from the Big Dipper mine, near Iowa Hill, Placer county. This mine used to be known as the Harmon mine and it is very rich. Charley Smith says that the gravel claims in that section are all looking well, and that a lively season is confidently expected. The Big Dipper mine is owned by Columbus Waterhouse, of the firm of Waterhouse & Lester, San Francisco.

Shasta.

GLADSTONE.—*Shasta Courier*, Mar. 25: The Gladstone mill near French Gulch is running steadily, about 75 men being employed at the mill and mine. The Brown Bear at Deadwood is employing a force of between 65 and 70 men. The Schroters have been making some improvements on the pumping machinery at their mine near town, in order to facilitate getting out ore. They are working a force of about five men, and are taking out some very good rock. The chances are that active operations will be begun on the Deaken & Taylor property at Lower Springs. A small force is waiting to begin work as soon as the weather permits. It is reported that the Calumet works, which have been idle for some time, will start up about the first of next month. The heavy rains of the past few weeks have furnished plenty of water for placer diggings, and the miners have been making the ground fly. The Walker mine at Old Diggings is about the only one in that locality where operations are being conducted on anything like a big scale. The mill is running steadily. Supt. Rippe's has struck the ledge in the lower tunnel, which is in 900 feet and taps the ledge at a greater depth than ever, exposing

a body of fine ore. Geo. A. Slocum and Mill Davis have been working the placer mine, across the river, owned by themselves and Frank Young of Shasta. They cleaned up over two ounces a day, when they had water. Lack of water is the main drawback, as the construction of a ditch would involve a considerable outlay of money. They have ground enough to keep them busy for two years, even with a good supply of water. Some of the nuggets taken from the claim are beauties. Frost, who, with Garrecht, took out \$2200 on Canyon Gulch recently, has sold a quarter interest for \$1000 to a man named Huse, who will work the property. They have favorable indications, but there is too much water to push work. Connor is running a tunnel on his ledge on Salt creek to tap the vein below the point where the pocket was taken out, and expects to strike the ledge soon. He has also been floating timbers down to his mines near the Tower House, preparatory to making further developments on the property this spring. Parker, who handled the Doebelin mining property near Muletown, has, we understand, left the diggings. The mines are all right, however, but require capital to develop them. There are parties ready to take hold of the property as soon as Parker lets go of it. Frank Tucker and Jim and Harry Paige have located a deposit of asphalt between here and Middle creek, the first ever discovered in this section.

FROM LOWER SPAINOS.—The borders of the Deakin and Taylor property have commenced operations. Two of the parties concerned are here taking part in the work. Connor's Co., on Salt creek, are still advancing their tunnel ahead. They are encountering strong ledge matter and are confident of striking the vein soon. McTimmons, of the Gipsy mine on Salt creek, informs me that the shutting down of the property was due to an increase of the flow of water in the shaft. As soon as the weather settles, the owners will probably erect machinery, so as to work the shaft more systematically.

Siskiyou.

PLACERS.—*Yreka Journal*, March 29: The Spangler Bros. are making preparations for big work in their extensive placer mine at mouth of Humburg creek this season. They will open up the claim from Klamath river along the creek bed, having just secured a fine double-act or double-cylinder 15-horse power steam engine, to hoist the pay gravel into the sluices and also hoist or haul out of the way the immense boulders at the mouth of the creek. They will also drain the claim with a large pump run by an overshot wheel in the creek, using both creek and spigge water for sluices. In case the creek gets too low to run the wheel in midsummer, a wheel will be placed in Klamath river, or else the work may be continued day and night by steam power. The pump must be kept working all the time, hence the necessity of a water-wheel for the pump when the claim is only worked during the day time. An exceedingly rich find of cinabar has been discovered lately by H. J. Barton and P. C. Lange, on Klamath river, opposite the mouth of Horse creek, below Oak Bar, the claim being known as the Molly O'Leary mine. From prospects so far realized, this mine is destined to prove one of the cinabar lodes in the State, and is also believed to be very extensive. Archie Nichols has been taking out some very rich specimen quartz lately from his ledge on the north fork of Greenhorn, and should he find the ledge permanent, it will be a fortune. C. A. Bogart & Co. have been ground-slucing steadily for some time past at their placer claim on Dutch creek, Klamath river, and expect to realize a handsome yield. They intend to keep on sluicing until the water supply gets low before making a clean-up. Austin & Co., of the Greenhorn blue gravel mine, have finally succeeded in fishing up their big pump, after considerable hard work in pumping out sufficiently with a number of small pumps. Their big steam pump is now fixed up in first class order, which will keep the claim drained for good work as soon as the water is all pumped out. The shaft is over 100 feet deep, which, with the drifts, contains a great amount of water, and a heavier flow is coming in at the present time than at any other period of the year, but not more than the pump can handle easily. A. Kaiser and H. Nicholas have taken out about 25 tons of good-looking quartz from the Clark & Wheeler ledge on Humburg, and will continue getting out more, so as to have a good supply for crushing by the time the snow melts off the road for hauling to mill at the forks.

Tuolumne.

TOO MUCH WATER.—*Tuolumne Independent*, March 25: Mining operations have been virtually suspended until the weather settles. It takes pocket-miners most of their time to get rid of surface water, and other miners are not delighted with the over-abundant soaking the country has had.

NEVADA.

Washoe District.

CON. CAL & VA. MINE.—*Virginia Chronicle*, Mar. 22: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 15th floors above the sill floor of this level. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connection with the north drift on the 1500 level. Also extracting a few tons of ore from the old stope east of the main south drift. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stope, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stope in working north from the crosscut run west from the northwest drift. From these north workings, 27 feet up, a west drift has been advanced 30 feet in a porphyry and quartz formation carrying a low

assay value. From the winze which was sunk from the crosscut run west from the northwest drift, at a point 12 feet down, we are working east and west in the old timbers and extracting some ore therefrom. Have extracted during the week from all parts of the mine 611 cars of ore about 605 tons. Shipped to Morgan mill 867 1270-2000 tons of ore. Average assay value, per railroad car samples, \$32.15. The average assay value, per battery samples, of all the ore worked at that mill during the week (845 tons) was \$28.11 per ton. Bullion shipped to the Carson Mint, assay value, \$12,691.94.

OPHIA.—500 level—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft, 1565 level—The winze now going down below the sill floor of this level has been sunk during the week 11 feet; total depth, 15 feet. In this sinking we have extracted during the week and raised to the surface 31 tons of ore, the average assay value of which is \$20.85 per ton. The bottom of this winze gives an assay value of about \$5 per ton.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 20 feet; total length, 69 feet, continuing in a soft porphyry formation carrying clay separations and showing fine lines of quartz. Jointly with the Ophir Co. on the 500 level from the Ophir shaft continue doing some necessary repair work in the west drift from the main shaft.

UTAH.—340 level—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 22 feet; total length, 205 feet; continuing in porphyry, clay and quartz formation.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 14 feet, making the total length 232 feet; the face is in porphyry. The joint Sierra Nevada and Union west drift has been advanced 13 feet, making the total distance west of the joint shaft 3036 feet. The last ten feet has been in soft clay and porphyry, from which there is a flow of four inches of hot water.

UNION SHAFT.—The joint Sierra Nevada and Union west drift 900 level, has been advanced 15 feet, making the total distance west of the joint shaft 3036 feet; the last 10 feet has been in soft clay and porphyry, from which there is a flow of four inches of hot water.

ANDES.—North drift from east crosscut No. 1 north on 420 level advanced 11 feet; total length, 172 feet; formation quartz. We are also easing timbers in this drift.

BEST & BELCHER.—200 level—West crosscut No. 1, started in northwest drift, 170 feet from our south line, has been advanced 5 feet during the past week and work discontinued; face is in hard porphyry; total length, 135 feet. At a point in this crosscut, 67 feet from northwest drift, run a north crosscut 15 feet, passing through quartz giving low assays. 900 level—The southwest drift started in west crosscut No. 3, 20 feet from top of upraise No. 1, 1000 level, has been extended 22 feet; total length, 42 feet; face in porphyry. Suture tunnel level—The joint east crosscut with Best & Belcher Company has been advanced 32 feet during the week, passing through porphyry; total length, 115 feet.

GOTTL & CURRY.—200 level—During the past week west crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been extended 17 feet; total length, 400 feet; face in porphyry. Suture tunnel level—The joint east crosscut with Best & Belcher Company has been advanced 32 feet; total length, 115 feet; face in porphyry.

HALE & NORCROSS.—Have completed repairs in south compartment and put in new guides from the 1100 to the 1300 level, so that the cage can now run through to the 1300 level in this compartment. Are now putting in new guides in the north hoisting compartment. Main incline—We continue making the necessary repairs. 1400 level—Have about finished repairs on this level. 1800 level—Advanced west crosscut on our south boundary 22 feet; total length, 32 feet; face in porphyry. The north prospecting drift from end of west crosscut No. 3, north of incline, was advanced 8 feet; total length, 50 feet. Have stopped work in this drift. During the week have done some work in the upraise started in No. 4 west crosscut from main north drift, but have suspended work for the present in this upraise. From crosscut No. 4 on our north line the Savage Company has started a drift into their ground.

CHOLLAR.—Are retimbering the west drift, 450 level, and making good progress retimbering the two north compartments of the main shaft above 930 level.

POTOSI.—East crosscut No. 3, 850 level, is on 310 feet; face is in clay and porphyry and streaks of low-grade quartz. The east crosscut opposite Potosi winze, 930 level, is out 321 feet; face is in porphyry. The north drift from top of raise, 1000 level, is out 208 feet; face is in porphyry and low-grade quartz. From this drift have started an upraise at a point 45 feet north from top of raise, 1100 level, which is 12 feet above the sill floor; top shows five feet of ore, car samples of which assay from \$20 to \$25 per ton. The east crosscut from the end of the south drift, 1000 level, is out 48 feet; face is in porphyry. Extracted and sent to the mill the past week 421 tons and 1500 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 360 tons; on hand at mill, 144 tons. Average battery assays, \$24.69; average car sample assays, \$31.70. Shipped to U. S. Mint, Carson, 417 pounds of crude bullion.

ALPHA.—No work has been done on the 1800

level during the week, on account of timbering the Ward shaft.

EXCHEQUER.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

WARD SHAFT.—No work has been done on the 1800 level during the past week, as we are yet engaged in retimbering the shaft.

BULLION.—No work has been done on the 1800 level during the week, on account of timbering the Ward shaft.

APEX.—Have an incline winze in the ledge 20 feet, giving indications of finding a large body of ore, which is increasing in value as it attains depth. It is very encouraging to the owners and to the community to have such glowing prospects. J. A. Higginson, secretary and treasurer of the Apex Company, will arrive shortly from New York to inspect the property, when a large force of men will be put on to develop it. Operations have been retarded, owing to the inclement weather.

KENTUCK.—From the stopes above the 160 level we continue to extract from two to three tons of ore per day of the average value of \$30 per ton as per car samples. The south drift from the Jacket east crosscut on 1100 level is in 130 feet and continues in ore of fair quality.

OCCIDENTAL.—The main north drift on 750 level has been extended 12 feet; total distance from No. 1 winze, 687 feet; the face of the drift is in quartz and porphyry. East crosscut from bottom of No. 2 winze in south drift, 750 level, is in 11 feet, face showing low-grade ore. The Zigzag drift, Sutro tunnel level, is in 882 feet; face in hard porphyry.

CON. NEW YORK.—The winze below the 650 level is down on the slope 110 feet; the bottom is in quartz showing bunches of ore of good grade. The west crosscut from the southwest drift from the shaft, 850 level, is out 117 feet; face is in quartz yielding low assays.

SILVER HILL.—The southeast drift, 450 level, has been advanced 6 feet, through hard porphyry; total distance from north line, 78 feet.

ARIZONA.

DRAGON.—Tombstone *Epitaph*, March 26: A. H. Wein, who has a lease on the old Peabody mine, shipped a carload of 20 tons of copper ore on Saturday. This ore goes to New Jersey. This makes a total of 70 tons shipped since last September, with an average return of 38 per cent copper and 27 ounces silver per ton. Mr. Wien has another shipment ready that will run still better than any yet taken out. The mine has been worked by the present lessees and has proved a bonanza for them and a source of profit to the owners of the property.

DOS CABEZOS.—A few new ideas are creeping into this camp. One mine-owner at least has been found who will lease his property. Stewart and Madden, owners of the Ewell Springs, have consummated a deal with Boyer & Fitch, whereby the latter will work the property and reduce the ore on a percentage. The lessees have control of five stamps and two concentrators of the Cincinnati mill near the mine and will start them up on the ore. This transaction, which appears on its face to be a very commonplace one, is a revelation to the inhabitants of the Dos Cabezas mountains. It is the first time that an owner of a claim on the big ledge has been found willing to do business as it is done in other mining camps on the coast, and the *Prospector* is of the opinion that it will prove an entering wedge in the building up of Dos Cabezas district.

SILVER CAVE.—Our informant, who is just from Dos Cabezas, says that this mine is a bonanza. From three to four feet of ore has been uncovered that will average across that distance \$52 per ton, while assays in many instances run from \$200 to \$300. The shaft is now down 20 feet below the tunnel which cuts the big ledge. A drift on the ledge is being run east and this high-grade ore is being taken out and piled on the dump. Mr. Delong, who is managing the property, is willing to make terms similar to those made by Stewart and Madden on the Ewell Springs, with a bond for purchase.

THE CASEY GROUP.—Openings on this bonanza from one end to the other show this wonderful property to be all that it has been represented to be. A shaft has been started on the easterly end of the claim, out of which \$75 ore is being taken the full width of this shaft.

DOS CABEZOS NOTES.—T. C. Bain is taking out ore from his mine, formerly the Murphy. He has it opened with one 40-foot shaft, one 20-foot shaft and a 90-foot tunnel. Sam Hanson is working the claim adjoining the Bain property. He is running a tunnel to strike the ledge, which he hopes to encounter in about 10 feet more of work. Sylvester Porter is working the old Greenhorn mine, which was originally the property of Sid Elsworth, the pioneer stage-driver, who drove over the old Butterfield route in early days. The Greenhorn was one of the earliest locations of the camp. A tunnel is being driven to tap the ledge. The old Rouse mine, at Hungry Gulch, eight miles east of Dos Cabezas, now belonging to Dan Wanghalt, is to have a cannon-ball mill placed upon it by the owner, who recently purchased the one which has been idle for some time.

DAKOTA.

OIL AT NEWCASTLE.—Deadwood *Pioneer*, March 22: After about a month of hard fishing, the tools lost in the test well of the Eagle Oil Co., at Newcastle, have been recovered and the drill will now be started to reach the well down to the third sand. The well is now about 600 feet deep, in the second sand, in which a 25-barrel pumper of heavy oil was struck. According to calculations based on old oil districts, the third sand ought to be tapped at about 900 feet, in which there is every reason to expect a good strike, a gusher being by no means improbable. A strong pocket of gas was

opened in slate at about 300 feet, and other small veins at a greater depth, while the presence of oil has been apparent almost from the start. The drillers consider the prospects as very flattering.

THE SITUATION AT HARNEY PEAK.—The situation at Harney Peak remains unchanged, and the men have about as little idea as the outside world as to what the great tin company proposes to do. Mr. Childs is still in New York and is frequently heard from, but nothing definite has yet come of his visit and the idle workmen are feeling far from encouraged. Quite a force of men are still at work keeping the mines free from water, but beyond this there are no signs of activity. The impression still obtains that operations will be resumed, but this seems to be pure guesswork, and as the company don't seem inclined to divulge its intentions, time alone will determine the future of the Harney Peak properties.

NOTES.—The Buxton Co. is working some 12 men and placing good ore on the dump for shipment in the spring. The Golden Reward Co. is working a large force of men on its different Bald Mountain properties and on the Wells-Fargo group, in Blacktail, shipping to its own works daily about 150 tons of good ore. It is expected that the pump will be in place in the Horseshoe shaft in a couple of days, when operations will be resumed and the expected ore still further sought after. Mr. White is as confident as ever that the ore is there in immense quantity, and that he will soon find it. A pump has been started in the Comet shaft, which is about 50 feet deep, and the work of sinking resumed. This shaft is not on, but adjoins, the Comet property, whose owners are bearing a portion of the expense for the benefit it is thought to be to their property. Homestake dividend No. 176, of 10 cents per share, is payable March 25th.

IDAHO.

ANOTHER MINE CLOSED DOWN.—*Cœur d'Alene Barbarian*, March 25: The effect of the high freight rates charged by the railroad companies for the transportation of ore is rapidly manifesting itself in all parts of the Cœur d'Alene, and the owners of mines see no way out of the difficulty but by suspending work on their various properties. The prices quoted in the Eastern market for silver and lead, combined with what is regarded as exorbitant transportation, are proving serious stumbling blocks in the way of mining progress and prosperity. Following in the wake of the Bunker Hill and Sullivan, the owners of the Morning mine at Mullan on Monday last closed down all work for an indefinite period. In an interview with a representative of the *Panhandle News* regarding this shut-down Superintendent Huntley said: "It would be impossible for me to tell you what will be done in the future, but one thing is sure, the mine will not be touched again till freight rates come down or else the prices of silver and lead go up. Our mine produces low-grade ore, and under present conditions we cannot work the mine at a profit. It costs us but little less than \$3 to mine and tram the ore, which at times has not run more than three to four ounces in silver. This shut-down is not a question of labor and we are not trying to make a cut in wages. Our company recognizes that you cannot get good men in a country like this for low wages, so there are but two hopes—one for a raise in the price of silver and lead and the other for reduced freight rates. When the company purchased this mine last spring there were thousands of tons of ore blocked off. True, it was very low-grade ore, but we saw that there was a large body and that with a good mill and other facilities for handling it, it would be a good investment. The company has expended over \$400,000 here. We have a fine mill, and as soon as it pays to work it again we will do so. At the present time we have given it a good, fair trial. We have gone behind and we can better afford to let the property lay idle and pay the taxes on it and interest on the investment than to continue operations at a loss."

UTAH.

NEWS FROM THE CRESCENT.—*Park Record*, March 25: The Crescent is again looking up, and, with a fair price for silver, will make a much better showing during the present year than it did last, as the ore mine at the mine are filled to overflowing with first-class ore and a high grade of concentrating rock. The writer is reliably informed that the 400 level is panning out in a remarkable manner, and there is more and better ore in sight to-day than at any time during the past three years, and the chute gives every indication of growing better as depth is obtained. A deal has been on foot between the Crescent Company and Mr. Treweek of the Alliance, whereby the former will be given the privilege of extending the Alliance tunnel into Crescent ground. While the deal has not as yet been closed up, there is every prospect of its being so as soon as Mr. Treweek returns from the East. This will give the Crescent a chance to prove its ground to considerable depth, and demonstrate whether it is advisable to drive the long drain tunnel now under contemplation. If no agreement can be reached with the Alliance Company, there is little doubt but that the proposed drain tunnel will be commenced at once, and, in that event, a number of assessments will undoubtedly be levied before it is completed.

THE GLENCOE SOLN.—According to advertisement, the Glencoe property was sold at Marshall's sale yesterday to satisfy the judgment secured against it by the Utah & Montana Machinery Company. Deputy U. S. Marshal John L. Weber presided, and the property was bid in by C. P. Mason for an amount equal to the judgment and costs of sale. This places the property in a peculiar position, and is quite liable to involve it in serious litigation, as Supt. Curtiss has also secured a judgment against the same property for wages due himself and the men em-

ployed, and, as the *Record* is informed, the question of wages supersedes all other claims.

CAMP CROSSCUTS.—During the week the Ontario mill shipped 42 bars of bullion, containing 24,772.08 fine ounces of silver. The Ontario is shipping no ore at all these days, and the only hauling being done is to the mill. Very little ore is being taken out. Matters at the Ontario drain tunnel are progressing smoothly these days, and about ten feet a day is being made. The face of the tunnel is in hard lime which carries lots of water. No men have as yet been laid off at the Daly West on account of the accident last week. It is thought that the machinery will be repaired and in operation again within a few days. Considerable active prospecting is reported as going on near the divide between Thayne's canyon and Cottonwood in spite of the deep snow up that way. The work is being done on the Scott Hill side of the canyon. At the Bogan group of claims the work of sinking the big incline is going steadily forward with increasing prospects of a good body of pay ore being soon uncovered. So far, very little drifting has been done on the vein, though what has been done is very encouraging. The Daly Mining Company has declared its regular monthly dividend of \$37,500, payable March 31st, in Salt Lake, San Francisco and New York. The Daly is improving with each passing month, and, unless the bottom falls completely out of the silver market, will continue to pay regular dividends. Richard Mackintosh, the sampling millman, has made arrangements whereby he will use the Crescent concentrator for sampling Anchor and other ores until his new mill is completed, plans and specifications for which are now being prepared. The construction of the new mill will be commenced as soon as the weather settles down and the snow gets out of the way.

WASHINGTON.

THE OLD DOMINION.—*Colville Dominion*, March 25: The Old Dominion is again the scene of the most lively camp in the State of Washington. Of late very little has been known of the workings of the property, excepting that the company has lately exhibited unusual confidence in the mine and has arranged for the expenditure of something like \$100,000 in development work on the property. Last week a large additional force of men was employed at the mine and the output of ore consequently increased to almost double. All these outward appearances have had the effect of inspiring great interest on the part of the general public as to the real condition of the Old Dominion, which for the past eight years has been the chief source of distributing revenue to the large surrounding country. It now transpires that the mine has developed in the upper workline six feet of a vein of pure lead carbonates, which will run as high as \$500 in silver to the ton, and instead of being an ordinary pocket of this quality of crude stuff, it seems to be a well-defined vein, and no perceptible indication of running short in quantity. The nature and extent of the Old Dominion remains no longer an uncertain quantity. It is certainly the biggest and richest mine in the State of Washington. During the eight years that have elapsed since the discovery of the Old Dominion she has produced over \$2,000,000 worth of the precious metals of the country.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 21, 1893.

- 493,972. — RAILWAY CATTLE GUARD — J. J. Burke, Roseburg, Or.
- 493,886. — SELF-CLEANING SCREEN — A. Fereva, Nelson, Cal.
- 493,887. — ALMOND-HULLER — A. Gamble, Nordhoff, Cal.
- 493,993. — FUNNEL — E. N. Gaudron, Portland, Or.
- 493,994. — FUNNEL — E. N. Gaudron, Portland, Or.
- 493,714. — METALLIC LATHING — E. Hawes, Sacramento, Cal.
- 494,010. — CULTIVATOR — H. M. Little, Rivera, Cal.
- 493,933. — CAR COUPLING — J. C. Look, San Jose, Cal.
- 494,067. — CAR COUPLING — J. C. Look, San Jose, Cal.
- 493,832. — FEED-BOX — J. L. Martin, Amity, Or.
- 494,112. — CANAL DIGGER — McMullen & Wood, S. F.
- 493,834. — LIN-HOLDER — D. O'Leary, Winchester, Cal.
- 493,877. — OIL CAN — T. A. Schleuter, Oakland, Cal.
- 494,046. — FOLDING GRATE FRONT — W. H. Vance, S. F.
- 22,301. — DESIGN FOR SPOON — W. S. O'Brien, S. F.

The following brief list by telegraph, for Mar. 25, will appear more complete on receipt of mail advices:

California.—Frederick W. Barkhaus Jr., Wrights, applicants for distributing water for irrigation; Lyman L. Dennick, Los Angeles, Ind.; George Edwards, Berkeley, heating attachment for gas burning; Edward H. Gerrish, San Francisco, liquid-shaking and cooling machine; Oscar M. Hill, Santa Paula, centrifugal honey extractor; Wm. L. Johnson, Pomona, salt box or cellar; Andrew G. Phillips, San Francisco, saw flier; Edward T. Taylor, Oakland, cash register and indicator; Wm. S. O'Brien, San Francisco, design for spoon-bender.

Oregon.—Frank Orth, Astoria, two patents for surgical appliances; Robt R. Parrish, Portland, fanning cover for beds, etc.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of especial mention:

CAR-COUPLING.—John C. Look, San Jose, No. 493,933. Dated March 21, 1893. The invention relates to the vertical-plane type, having pivoted hook-heads and pivoted guards, and consists in an automatic lock for the pivoted guard whereby it is held in a fixed position when the coupling is under draft and released when buffing, or when a coupling is to be made. It more properly relates to an improvement on a car-coupling described in patent No. 474,090, granted to the same inventor May 3, 1892.

CAR-COUPLING.—John C. Look, San Jose, No. 494,067. Dated March 21, 1893. This relates to the vertical-hook type of coupler, having a flat-face, pivoted hook-head, with a buffer-arm and guard integral with the draw-bar. It consists in a buffer-arm, the face of which is flat, or at right angles to the line of the draw-bar in order to meet the opposing flat-face hook-head and prevent the breaking of the hooks. It consists also in other devices, combinations and arrangements whereby the flat-face buffer-arm can be effectively used and other results obtained in connection with such arrangements. One of such other results is the turning of the pivoted hook-head in the coupling operation by lateral force instead of longitudinal impact. Another of such results is the forcing of the hooks into each other in drawing, and thereby getting the full strength of the hooks instead of allowing them to assume their positions voluntarily. The invention further consists in a novel chain-and-spring connection between the pivoted hook-head, commonly called the "knuckle," and the unlocking lever, whereby the knuckle is thrown open when the lever is set uncoupled and the cars are separated.

SELF-CLEANING SCREEN.—Antony Fereva, Nelson, Bette Co. No. 493,886. Dated March 21, 1893. This invention relates to the class of self-cleaning screens and consists in peculiar and novel combinations of endless traveling, shaking screen and rollers for supporting the screen, and with which it comes in close and direct contact, and adjustable tightening roller and a top supporting roller. In this device, by having an endless traveling screen which, during the course of its travel, comes in direct and close contact with the surfaces of the rollers, the cheat sticking in the meshes of the screen is forced out by this contact with the rollers, whereby the screen in its travel is enabled at all times to present a perfectly clear and clean operating surface.

ALMOND OR WALNUT HULLER.—Albert Gamble, Nordhoff, Ventura Co., Cal. No. 493,887. Dated March 21, 1893. The object of this invention is to provide a simple and rapidly operating machine for removing the hulls of almonds or walnuts. The unhulled nuts are supplied to the hopper, and by it are fed down upon a rapidly rotating cylinder. They are caught by the arms of the cylinder and hauled or thrown by force against a board or wall which forms part of the apparatus. The force with which the nuts strike against this wall is sufficient to cause them to rebound into the path of rotation of the beater arms of the cylinder, and, while still in flight, they are struck by said arms and the hulls are broken and disengaged from the nuts, both nuts and hulls then falling down upon the inclined bottom of the casing, and, passing under the wall, are discharged into a suitable receptacle. The nuts are not injured by the blows of the beater arms, as they are then in the air, and the blow delivered, while sufficient to break and disengage the hulls, is not enough under the circumstances to injure the nuts, as would be the case if they were struck by the arms while resting on some solid foundation.

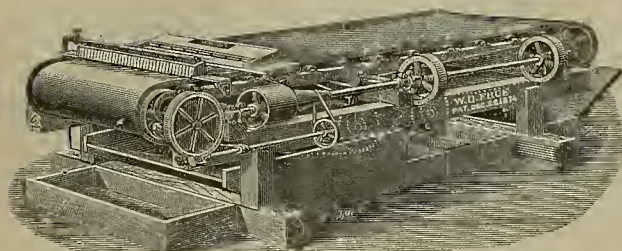
FOLDING GRATE FRONT AND HEARTH.—Wm. H. Vance, S. F., assignor of one-half to Georges Humphreys. No. 494,046. Dated March 21, 1893. This consists of plates hinged together and pivoted or fulcrumed at the lower end, and adapted to fold up so as to lie flat in front of the grate and form a hearth, or to be unfolded and turned up so as to fill the entire grate-front. In conjunction with this is a damper.

MACHINE FOR FORMING CAN BODIES.—Robert D. Hume, Gold Beach, Oregon. No. 493,588. Dated March 14, 1893. This invention is designed to form can bodies for various purposes, and it completes them in a single continuous operation, commencing with the sheets of tin which are supplied at one end and are then cut to the desired size. They are then moved forward automatically and delivered to mechanism which bends the edges to form the interlocking hooks, after which they are advanced to devices which bind them into a cylindrical form, interlock the edges and close the seam. From this point the cylindrical bodies are advanced to a point where acid is applied to the seams to facilitate soldering, and are then delivered to the solder bath where melted solder is applied to the seams, the surplus being removed by wipers, after which the can bodies are delivered from the machine in a completed condition ready for the heads. The movements are all effected by suitable mechanism, the bodies being moved forward by carriers having an intermittent motion.

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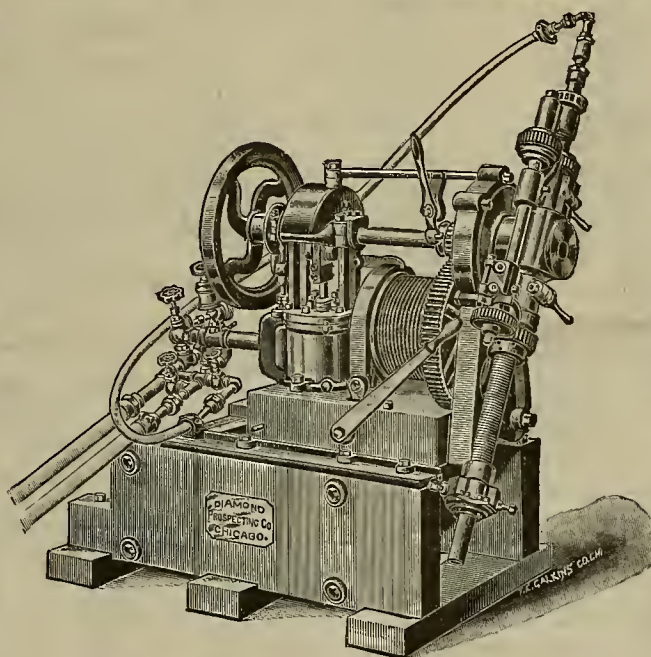
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Ryan McDonald Hoisting Engines,
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Common Sense Whim and Attachments,
Hand Winches,
Copper Smelting Works,
Lead-Silver Smelting Works,
Water Jacket Smelting Furnaces,
Roasting Furnaces,
Chlorination Works,
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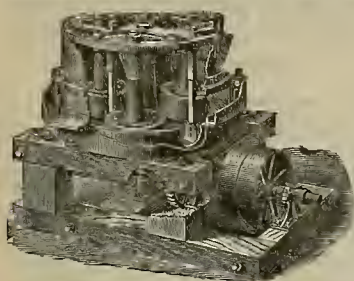
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VOL. LXVI. — Number 14.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, APRIL 8, 1893.

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California Street Paving Material.

Supervisor Denman deserves the thanks of the community for his efforts on behalf of good foundations for the bituminous pavement now being laid in this city. He has introduced a declaration of intention not to accept bituminous pavement laid upon a concrete foundation composed of red rock, and notifying the Street Superintendent to specify that none but clean sand from near Black Point and rock fully up to the specifications of the Board must be used in concrete foundations. Mr. Denman declared that he lately inspected a number of streets and found that the bitumen was wearing out, although they had only been accepted a short time. Upon a careful examination he invariably found that the pavement had not been spread upon a proper foundation. He said that he had been told that unless the rock and sand were properly made it did not matter how much cement was put in. Red rock will not stand the test, because it easily becomes mud and does not make good concrete.

There is plenty of good rock available, and its use should be insisted upon by the Supervisors and Superintendent of Streets. It is not necessary to limit the contractors to one special kind of rock, but they should be prevented from using that which is known to be bad.

The question of proper foundation for this kind of pavement is a very important one indeed, for no matter how good the bituminous material, unless laid on a good base, it soon gets in bad order.

An equally important consideration, however, and one to some extent ignored, is the character of the bituminous rock itself, with respect to the percentage of fixed bitumen it contains. California has the most extensive and varied deposits of asphaltum and bituminous rock in the United States, but there is a very great difference in these deposits as to the value of the material for paving purposes.

Some material has a high percentage of fixed bitumen and some has a very low percentage. That with a small amount is friable and apt to crack when the volatile oils have evaporated. This evaporation takes place more readily when the substance is spread out and exposed to the sun and air as when laid for street paving.

The better grade of material with a high percentage of fixed bitumen is almost a different substance, so changed are the characteristics. This is more plastic and much

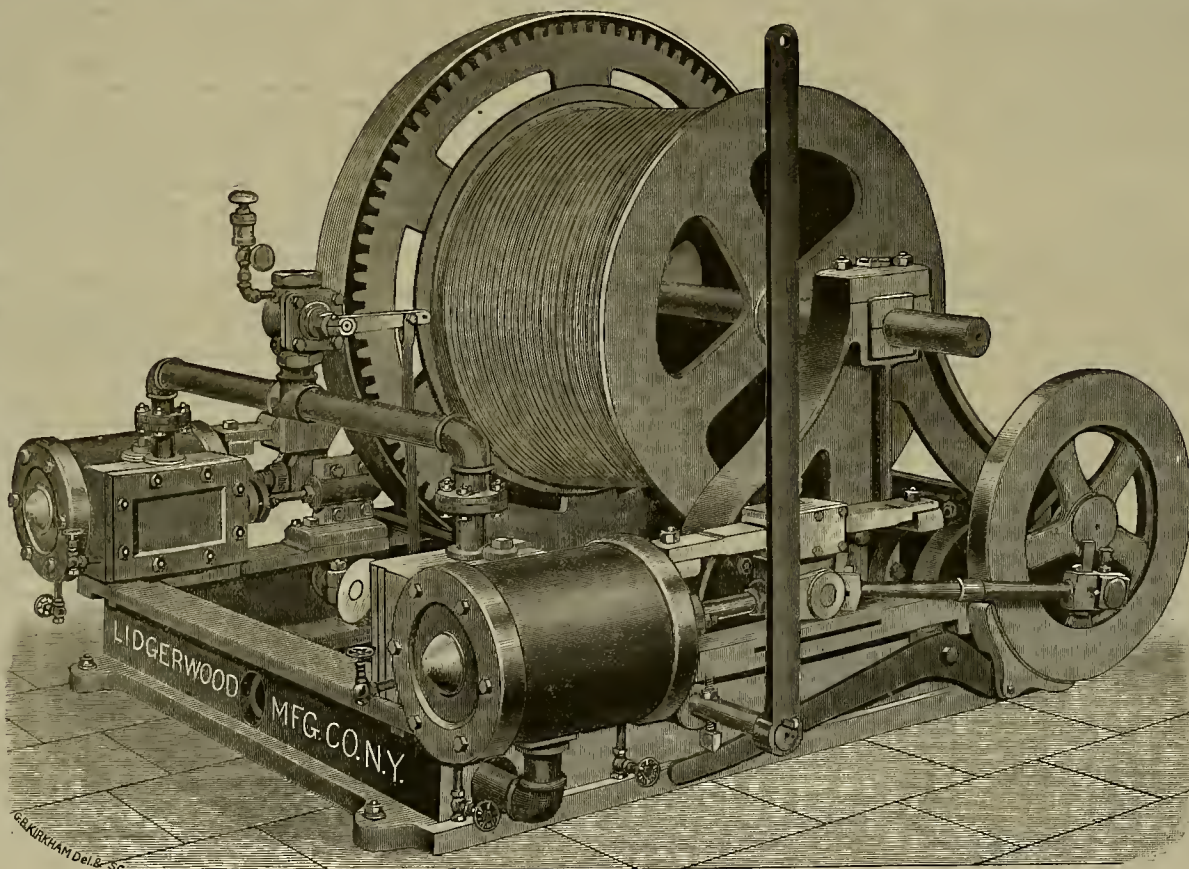
more durable. After shipment it can be reduced with sand, and still be better than the poorer grades.

There should be a chemical examination of these paving materials, and more attention paid to the grade which is used on the streets. Some of it is unfit for use where there is heavy travel, by reason of its friability after some months use. There are so many good deposits to draw from in California, that it is unnecessary to accept the poorer grades of material simply because they are cheap. It will pay better to get good bituminous rock or asphalt in the first place, since it lasts much longer and requires less re-

A Blast Furnace Hoisting Machine.

The engraving on this page represents a Lidgerwood hoisting engine of the regular double cylinder reversible link motion type, with compound gear and improved throttle valve connection. They are made particularly strong and substantial in every part. Owing to their simplicity of design, they are not liable to get out of order or give out at a critical time; and as there is nothing about them with which an ordinary engineer is not familiar, they are very easily taken care of and run. This hoist is especially de-

signed for blast furnace work. The engines are designed to run two cages in the usual manner, one ascending while the other is descending, and the drums are of sufficient capacity to hold double ropes, if desired; or, being spirally grooved, a single rope with a few turns around the drum, and the ends fastened to the cages, will operate equally as well. Hammered steel drum, crank and intermediate shafts of great strength, are used to ensure safety. The safety brakes on the crank wheels are applied automatically, by means of an adjustable steel toe on the rocker shaft, by simply moving the lever to the central position, and are released as the lever is moved either way to hoist or lower. The cages are under complete control of the operator, and are handled by means of chains



DOUBLE CYLINDER REVERSIBLE LINK MOTION AND SAFETY BRAKE GEARED HOIST.

pairs. This is a matter to which the attention of the city supervisors should be turned.

SAN FRANCISCO parties are figuring on the possibilities of building another smelter in Stevens County, Washington. The chances are favorable that if they decide to operate there Colville will be made the base of operations. There have been some fine showings of high grade ore developed through the county during the winter.

The old Barbee & Walker mill at Silver Reef, Utah, which has been remodeled so as to run by water power, will be started up in a short time. It has a capacity of 50 to 75 tons a day. Chloriders are at work mining low grade ore, and good times are expected in the old sandstone camp.

NONE of the miners' unions or Montana have any connection with the United Mine Workers of North America, who threaten to strike in the Pennsylvania coal mines. Montana miners have an independent organization known as the State Association of Quartz Miners.

or ropes running up the hoistway. The cages are usually adjusted so that at the top and bottom they stop themselves automatically. All parts are made to gauge, on special tools, and are perfectly interchangeable, and finished parts of all sizes are always kept in stock. Every engine is thoroughly tested by steam at the works before being shipped to the agents here, the Parke & Lacy Co.

At the last meeting of the board of trustees of the Mechanics' Institute, Arthur F. Allen, a graduate of the University of California, was appointed instructor of mechanical drawing for the institute, in place of David Cummings, who submitted his resignation.

THE foreman of the coinage department of the San Francisco Branch Mint in this city reports the coinage for March as follows: Double Eagles, \$1,000,000; Eagles, \$250,000; Half Eagles, \$400,000; total coinage for the month, \$1,650,000.

FOUR THOUSAND MINERS are thrown out of work by the closing of several collieries in Rhodda Valley, South Wales.

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San Francisco, April 8, 1893.

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Comment.

Those who look upon California as a gold-producing State only may be surprised at the figures of quicksilver production given in an article in another column. While they refer mainly to the product of only one mine, they give an indication of what has been done with quicksilver properties in this State. There are many other mines, some of them now producing quite largely. Quicksilver is one of the valuable products of California which no other State has to any extent. The same may be said of chrome ores. Borax is only found in California and Nevada. The values of these products never appear in the statistics of mineral production. There are many other mineral and metallurgical products for which we get no credit in the published statistics, these being based mainly in gold, silver, lead and copper. California does not, therefore, have the standing it really merits in point of mineral wealth. It is to be hoped that hereafter the State Mining Bureau will prepare the annual statistics of production of mineral substances, and not leave it to the United States Mint Department which gives figures only of gold and silver. With correctly prepared statistics published early every year by the State Mineralogist, and including all mineral substances, California would have a better reputation as a mining State.

San Francisco men are figuring on building a smelter at Colville, Washington; and parties from Portland, Oregon, are figuring on building a smelter at San Francisco. Apparently the disposition to go away from home to make investments in mines or reduction works is not confined to any one place. The more smelters there are the better it will be for the miners, for competition will bring about fair rates.

While the arrivals of foreign and coast coals have been light recently, we still took 117,800 tons at San Francisco in March. British Columbia gave us 34,400 tons, and we got 25,800 tons from Great Britain, 16,400 from Seattle and 22,500 from Tacoma, the rest coming from Australia and the East. The Vancouver Coal Company's mines at Nanaimo are the largest producers on the coast. The Vancouver Coal Company has two large mines, namely, the Nanaimo and the New Wellington, that are working three shifts of 400 men each, or a total of 1200 men. The output is from 1900 to 2300 tons a day, although it could be made 4000 if the demand warranted. The mines ship from 500,000 to 600,000 tons of coal a year to San Francisco, both by steam and sail. The owners, while denying that there is to be any cut in wages of miners, claim that they make no money, because coal is too cheap. The idea of coal being too cheap on this coast is rather amusing.

With coal at half its present cost, San Francisco manufactures would experience a revival. It is a good thing that the wheat fleet from Great Britain, by bringing coal here, keeps the coast coal prices down. That is, it is good for the consumer, although the colliery men do not view it in that light.

If there are now any hydraulic mines being worked surreptitiously, or contrary to law, in the area drained by the Sacramento or San Joaquin rivers, as claimed by the anti-debris people, they can only do so a few weeks longer. The penalty clause of the Caminetti law goes into force May 1, 1893, and anybody found illegally mining after that date may be fined up to \$5000 or imprisoned for a year, or both, and anybody destroying or damaging a dam or restraining works is subject to the same penalties. Some of the valley papers think all the monitors in the country were turned loose after the Ford bill passed. All the muddy water coming down with the winter floods is laid to illegal hydraulic mines. That some men have taken advantage of the abundance of water there can be no denying, but they have done this every year where possible. The large majority, however, are abiding by the law. Those who have not will be compelled to after May 1st. While the MINING AND SCIENTIFIC PRESS has advocated the resumption of hydraulic mining by legal methods, it has never expressed or had any sympathy with those few men who broke the faith pledged in their behalf by the State Miners' Association. These men have greatly injured the miners' cause for their own personal benefit. They are as much enemies to the mining industry as the anti-debris fanatics. If such men are caught violating the law, we shall rejoice in their punishment as much as the most ardent anti-miner. The Miners' Association, through its executive committee, has tried its best to stop illegal mining, but has been unable to control all individuals. They are few, as we have stated, but their acts have been magnified by opposing interests so as to include all the hydraulic miners in the State. A few weeks more, however, and these men will be confronted by grave penalties for violation of the laws. If they persist, punishment will follow, and they will receive no sympathy from the law-abiding mining community. The anti-debris papers can afford to wait these few weeks without stirring up further useless strife and contention.

Our anti-debris friends of the valley are needlessly alarming themselves on the subject of the effect of the Ford law and recent hydraulic mining legislation generally. In the MINING AND SCIENTIFIC PRESS of last week Senator Ford explained the situation very clearly. The miners are given no rights they did not formerly possess, but these rights are more clearly expressed in the code. They cannot now work hydraulic mines and commit injury any more than they could before. The reason the miners rejoice is not that they can go ahead and mine in any way they want to, but because both the Government and the State have officially recognized hydraulic mining as a legitimate industry when it can be carried on without material injury to the streams or adjacent lands. Congress had enacted a law to this effect before the legislature did the same. The limitations of methods of conducting the business are expressed in the Caminetti law which is now in force. The anti-debris associations and officers have had their own way for so many years that they have come to look upon their own way as the law. These congressional and legislative enactments, following the most recent decisions of the U. S. Courts, settle the whole matter. The talk of the valley people of accepting the Caminetti law because they like it, and rejecting the Ford law because they do not, is foolish. The State law is in direct line with the Government one. The miners can now mine, but under certain specified restrictions. These restrictions, however, are laid down by the United States laws, and not by our anti-debris association, and in this the miner has a distinct advantage. The people of the State generally are glad that there is now a special law on the subject which takes the matter out of the hands of prejudiced men on both sides of the controversy. The Government provides a Debris Commission, and the State provides one, these to work in conjunction. It is probable that they can settle all differences without assistance or advice from the Anti-Debris Association. It is now entirely an engineering proposition, to be determined by engineers, and prejudiced partisans will be apt to have very little to say.

D. P. CARR has been elected secretary of the Southwest Silver Convention, to be held at Silver City, N. M., on the 4th and 5th of July.

THERE is \$55,381,615 in coin in the Sub-Treasury in San Francisco. Of this, \$27,238,415 is in gold.

THE *Mining Age*, of San Francisco, Salt Lake and Denver, has suspended publication.

Record of a Quicksilver Mine.

The New Almaden quicksilver mine, Santa Clara Co., California, once the proud rival of the celebrated Almaden mine in Spain, has given up its second place to the Idria mine in Austria, and its production is steadily declining. Last year the total product was the least in its history for any twelve months work. The mine's highest production was in 1865, when it yielded 47,194 flasks of quicksilver of 76½ pounds each. This was an average of 3,933 flasks a month from 11.30 per cent ore. In 1892 the yield was 5,610 flasks or 467½ flasks a month from 0.72 per cent ore. As far back as 1877 the ore yield was down to 4.93 per cent, and then for many years it was between two and three per cent. In 1888 it was 2.40 per cent; 1889, 1.73 per cent; 1890, 2.02 per cent; 1891, 1.22 per cent, and 1892, 0.72 per cent. This is the first year in the history of the mine when its ore was below one per cent. In the early history of the mine the yield of the ore was between 20.22 and 36.74 per cent, and it was always above 10 per cent until 1867. The mine yielded 12,000 flasks in 1890, 8,200 flasks in 1891 and 5,610 in 1892. These figures of product and percentage, while not complete, show that the mine is pretty well worked out.

The quicksilver mines and reduction works of New Almaden are fifteen miles south of the city of San Jose, Santa Clara County, in the Santa Cruz mountains, at an elevation of 1700 feet above the sea. These mines were first worked for quicksilver in 1845, but the operations were on a small scale, and no record exists earlier than 1850. They have been the most productive quicksilver mines in the world, excepting only the mine of Almaden in Spain. They are developed to a depth of 2500 feet, and the workings extend horizontally over a piece of ground one mile square. About 350 men find steady employment, the work being actively prosecuted throughout the year. From the 1st of January, 1864, to the 31st of December, 1892, the number of feet of drifting and sinking in the mines of the company, as shown by the records, amounted to 262,270 feet, or 49 67-100 miles, at a cost of \$2,221,337.71. This does not include the excavations made in extracting ore during the period named, nor any expense for the same, while for the ground opened up during the previous period (1850 to 1864) 15 more miles of drifting and sinking can be added.

The reduction works consist of eight furnaces, and include the most improved methods for working quicksilver ores, and may be considered as the most complete and perfect in that respect in the world.

Mr. James Butterworth Randol was the manager and sole representative of the Quicksilver Mining Company in California for twenty-one years, which position he resigned on the 6th of March, 1892. During his administration 389,122 flasks of quicksilver were produced, and sold at an average of \$36.32 per flask; from this and rentals, etc., \$14,939,055.41 were received, and the disbursements were: for pay rolls, \$6,703,628.66; materials and supplies, \$2,125,628.49; miscellaneous expenses and taxes, \$936,793.64; a total of \$9,766,050.79, leaving a profit balance of \$5,173,004.62.

A record has been kept since July, 1850, and from this mine alone 919,698 flasks of quicksilver were produced from 1,418,450,840 pounds of ore, of an average percentage of 4.96. Including 10,571 flasks from the Enriquita mine, the total product of all the mines on the company's property for forty years and three months (483 months) has been 930,269 flasks of 76½ pounds each, or 71,165,578 pounds, or 35,582 tons of quicksilver.

It will be noticed that during Mr. Randol's administration (21 years) the mine produced 389,122 flasks of mercury, and from this and rentals \$14,939,055 were received. But this is only 21 years of the 40, and only accounts for 389,122 of the 930,269 flasks. What the receipts were from the other 540,147 flasks has not been made public, or is not of record.

The world's production of quicksilver in 1880 was 122,536 flasks, of which California mines produced nearly one-half, which with a total production of 113,842 flasks in 1889, California only claimed 23.25 per cent. The percentage is still less this year, and the export trade has fallen off materially also. New utilizations of the metal have not been discovered and the general depression in the Comstock mines has had a bad effect on the California quicksilver mines. Between 1880 and 1889, 50 mills in the Comstock region were working 1,268,083 tons of ore, used 2,498,258 pounds of quicksilver or 1.79 pounds per ton of ore. Comparatively few mills are working now and much less ore is being treated.

We have considered in this article only the principal one of the California quicksilver mines, but there are many more mines, some of them producing largely. The record of this one mine, however, is of great interest as showing the nature of the quicksilver mining industry in this State. California is usually looked upon as a gold-

producing region only, and its quicksilver mining interests are seldom considered or referred to in its statistics of mining products. Yet it is the only State in the Union producing quicksilver, except Oregon, from which a small amount comes. We are indebted to Mr. Robert R. Bulmore of the New Almeda mine, and Mr. J. B. Randol of this city, for the statistics given in this article.

Foundry Notes.

Contracts were awarded this week by the city trustees of Vallejo, Solano county, for the pipe and the tunnel work for the new Vallejo Water Works system. Several San Francisco firms were bidders and the competition was close. The tunnel on the line is to be 1905 feet long, and the contract for it was awarded to Phillips & Searls for the sum of \$10,560. Wehner & Farrel of San Jose also bid on this work and claim that the bid accepted was higher than theirs, the award being based on a mathematical error. The San Francisco Bridge Co. bid \$10,000 for this same work, but inserted a clause in their bid that they would not take the tunnel unless their bid for pipe was also accepted. The Bridge Co. withdrew this exception, finally, and offered to take the contract for \$10,000, but the trustees refused to entertain any bids with "strings" attached, and thus awarded the contract to Phillips & Searls for \$560 more than the San Francisco Bridge Co. asked.

As to pipe, section 1 for 12-inch riveted pipe amounting to 20,430 feet was awarded to W. W. Montague & Co., of San Francisco, for \$18,560, theirs being the lowest bid on the section.

Section 2 of 42,923 feet of 8-inch lap-welded pipe and section 3 of 11,493 feet of 10-inch lap-welded pipe was awarded to Riffe & Hinkle, contractors, of Portland, Or., for \$43,250.92. Before this award was made there was considerable discussion. The Risdon Iron Works of San Francisco, whose bids for sections 2 and 3 was for Mattheson joint lap-welded pipe, claimed as they were the lowest bidder on that class of pipe, the board had decided to adopt, the contract should be awarded them. Trustees Frey and McCauley claimed that Riffe & Hinkle, of Portland, Oregon, were lower than the Risdon Iron Works on the section named. The discussion that followed shows that these gentlemen had intentionally ignored the freight reduction clause in the Risdon bid, and as some members of the board appeared not to fully know the circumstances under which this clause had been inserted, the representatives of the Risdon Iron Works asked permission to make a statement. His statement was in substance: "On the evening the board received these bids and after the Risdon bid had been handed to the Water Committee and by them locked up in this safe, but prior to the expiration of the time for accepting bids, he asked Mr. Browne of the Water Committee if it would be in order for him to insert a freight reduction clause [in the Risdon Iron Works bid] that would enable the board to make a large saving in the cost of pipe. After conferring with Mr. Frey, who also gave his consent, the bid was withdrawn, the clause inserted, bid sealed, and returned to the committee, Mr. Frey remarking that 'we want to consider everything that will make a saving to the city.'"

Mr. Frey denied that he had assented to this and there was considerable wrangling over the matter. The contest for the contract was wholly between the Risdon Iron Works and the firm of Riffe & Hinkle. The last-named firm took exception to that part of this Risdon's bid on the matter of freight, claiming it specified nothing; and had no right to be considered. They claimed that they were the lowest bidders, and were entitled to the contract. The bid accepted was for \$43,250.92. The Risdon Iron Works bid was \$41,617.62, less the difference between all-rail freight and freight by steamer, approximated at \$2000, or \$42,617.62, equal to \$633.30 less than the successful bidder on the facts of things. The board, in coming to its conclusion as to who was the lowest bidder, by a vote of 4 to 3, refused to consider the approximated sum of \$2000 as a specific part of the Risdon's bid, and on that ground awarded the contract to Riffe & Hinkle.

Thus, on both this tunnel and the pipe work of sections 2 and 3, there were contractors who bid lower than those who received the awards, as explained. The pipe will all come from the East. The contracts for the distributing system in the city are shortly to be let.

The Thompson-Houston Electric Company has filed a replevin suit against the San Francisco and San Mateo Railroad Company to recover possession of electrical machinery and appliances furnished, to the amount of \$100,000, sold under a stipulation that the ownership of the property was not to pass from the Thompson-Houston Company until the full purchase price should be paid. The supply company now demands payment, or the return to them of the material furnished the railroad.

At the meeting of the directors of the Idaho mine, of Grass Valley, on Monday, Edward Coleman resigned as superintendent of the mine. He has been superintendent since 1865. The mine has produced \$11,500,000 in gold and has paid \$4,500,000 in dividends. Eugene Creller, for years the amalgamator at the mine, was elected superintendent. Mr. Coleman goes East, but will make his home in San Francisco. The directors declared dividend No. 273, the amount being \$3 per share.

A BIGH deposit of cinnabar ore is reported opposite the old Napa Consolidated mine, just across James creek, ten miles from Middletown, in Napa county. The discovery was made by H. Fraser, G. A. Sairy, J. B. Jamieson and H. Shore, four old miners, who have been at work some time. On Saturday they found their ore to contain ten per cent of quicksilver.

Coast Industrial Notes.

The cost of operating the municipal electric light plant at Alameda, for the three months ending March 31 was \$2517.87.

As soon as the weather will permit, work will be commenced on the electric railroad between Nevada City and Marysville.

The board of officers to examine into the needs and requirements of the Mare Island navy-yard, consisting of Captain Mathews, Chief Engineer Farmer and Naval Constructor Taylor, will convene about the 12th of the month.

There are at the present time six beet sugar plants in this United States, three of which are in California, two in Nebraska and one in Utah. The three California factories turned out during the season of 1892 fully 23,000,000 pounds.

The new jute mill at San Quentin is nearly finished, and within six weeks 800 convicts will be at work turning out jute bags from the largest jute factory in the world. The new mill doubles the capacity of the prison plant, and this means a possible output of from five to six million bags a year.

Some Portland, Oregon, men intend to organize a company to can turtles at Magdalena bay, Lower California. Mr. Allen M. Barry stated that if his company was incorporated it would be located in San Francisco, as it would be more convenient to have the goods shipped to this city than to Portland, Or.

The butter shipments from Humboldt county last year amounted to 1,936,000 pounds, this amount including keg, pickled roll, etc. From present indications the shipments for this year 1893 will be far in excess of this amount. As yet the creameries have done practically nothing in the way of shipping cheese.

The Treasury Department has notified the Collector of Customs at San Francisco that on the exportation of dynamite manufactured by the Giant Powder Company of San Francisco from imported glycerine and other materials a drawback bill will be allowed equal in amount to the duty paid on the glycerins used in the manufacture, less the legal deduction of 1 per cent.

The schooner Ozar, which sailed this week for Mazatlan, Mexico, with a general cargo, is a veritable floating magazine, having on board 50,000 pounds of dynamite and 1000 cases of gunpowder, consigned to a Mexican firm. The exports of ammunition to Mexico in the past three months have been unusually large. It is generally understood that it is intended for transshipment to some one or two Central American republics.

At the last regular monthly meeting of the International Brotherhood of Steam Boilermakers and Iron-Ship Builders of the United States and Canada the following officers were selected for the ensuing year: President, O. J. Gilhert; vice-president, Fred Murphy; recording secretary, M. J. Bird; financial secretary, John Connors; corresponding secretary, M. B. Sullivan; treasurer, Hugh McAvoy; marshal, Harry Boucher; board of trustees—William Shandley, Charles Tracey, John Norris.

TRACKING for the new electric road on Mission street has been completed from the Chiua-avenue terminus at the Five-mile House for nearly a mile to a point some 200 feet below St. Mary's College. Ground has been broken and plowed half a mile farther in, and is ready to receive ties and rails. The new railroad is being solidly built, and a good foundation of finely crushed and rolled macadam is being laid. Rapid work is being done by the Pacific Improvement Company, which has the contract to lay the roadbed, but two weeks having elapsed since the commencement of rail laying. In that time over a mile has been laid with rails.

The Los Angeles, Owen's Valley and Utah railroad is projected to begin at Bishop's creek, about twenty miles north of Independence, Inyo county, and ten miles from the upper end of the canal. The line will pass through Independence, Lone Pine, Olancho, Rose Springs valley and Indian Wells valley. Thence it will bear to the west, and end at Mojave, the total length being 140 miles. Engineers are now making the survey, and securing the rights of way. Little grading is required. Work will be pushed, and it is intended to extend the line eventually southerly into Los Angeles and northerly into Utah. An English company is to build the road.

INFORMATION has reached this city to the effect that by an agreement entered into between the rubber manufacturers of the East there will be an increase in the price of rubber goods. It is said that the increase in the price to the jobber by the new list and terms is 25 to 33 per cent. This will cause an advance in rubber boots of about \$1.50 to \$1.75 a pair, and of 25 to 30 cents on overshoes. The manufacturers will have their headquarters in Boston. It was expected that the compact would be effected before the winter set in, but some factories held out too long. There are a few manufacturers though who have not joined the combine, but they exact the same terms as those in the compact.

THERE are about 250 lathers in San Francisco and they are unsatisfied with the wages. It is claimed by the lathers that for two years they have been at the mercy of the plasterers, who have systematically reduced wages, until it is impossible to make half the money which was formerly paid for work. An expert lather will put on from 2,000 to 2,400 laths in a day, and when they were paid by the piece, it was at the rate of \$2.50 per thousand. But of late the highest wages have not been above \$2 per day. It is understood that they propose classifying lathers in three grades, which shall receive respectively \$2.50, \$3 and \$3.50 per day, and that all work on which members of the union are employed shall be abandoned until the increased demands are met by the bosses.

THE city council of Santa Rosa adopted an ordinance calling an election May 9th for the purpose of voting \$165,000 in bonds for the construction of a new system of water works. A few days ago the council asked Colonel Mark

L. McDonald, president and principal owner of the Santa Rosa Waterworks Company, to make a proposition for the sale of the present system. He complied with the request, offering to sell his system to the city for \$210,000. As the last sworn statement of the company valued the works at about \$153,000 the council declined the proposition. This system to be adopted, should the bonds carry, is the Wagner steam-wheel system, and it will be put in by the National Water Supply Company of Cincinnati, O.

J. M. ASHTON, General Western Attorney for this Northern Pacific Railroad, with headquarters at Tacoma, is at the Palace. Mr. Ashton said it had been very dull in Washington for two years past, but lately there has been much improvement. The greatest progress of this past year has been at Everett, where a town of almost 6000 has been built up in a little more than that time, and where extensive manufactories employing thousands of men have been established. Spokane is reasonably active, and it is quiet at both Seattle and Tacoma, but the outlook for the latter cities is especially promising. The lumber interest is dull, so Mr. Ashton states, but lately purchasers from Wisconsin and Michigan have been arriving, and this with an increased activity in mining near Mount Tacoma and Monte Cristo and other districts, has put the new State on a much healthier basis.

THE steamer Rosalie, built at Oakland for bay excursions had a successful trial trip a few days since. She is 146 feet long, 17 broad and 10 deep. Her engines are 600 horse-power and capable of propelling the little craft at the rate of sixteen knots an hour. Her net tonnage is 500. The woodwork in the cabin is of native sycamore, beautifully polished. Soft terra-cotta mosaics cover the floors. The ceiling is covered with a cream-colored paper. The large aftercabin, directly beneath the main saloon, is finished as handsomely as the saloon. The bar forward is a feature of the steamer. The floor is covered with the finest of English linoleum and the heavy beams are tinted in cream. The smoking-room on deck is furnished in keeping with the rest of the vessel. Electric lights are used throughout. The Rosalie is one of the handsomest steamers ever built on this bay.

THERE is trouble of a serious nature between the members of the American Fishing Union, which comprises the men who go out to sea in small boats on the one hand and the owners of steam fishing boats and the heavy dealers on the other. For some time the former have complained that they were not being dealt with fairly, and as a last resort, so they say, they decided to ignore the middle men and engage in business on their own account. Accordingly they banded together and opened a market of their own on Merchant street in a building formerly occupied by a firm of pork-packers, but which is newly fitted up. The new venture is simply a move on the part of the fishermen to benefit themselves and the public at the same time. In the past the middle men have not acted fairly either way, but have taken every opportunity to carry things with a high hand. By combining they compelled the men who catch their fish to sell at ruinous prices, and then would force the public to pay whatever was demanded. The result was an enormous waste, which it is proposed to do away with.

SANTA MONICA has been declared an open port, ready to do shipping business with any part of the world. The ship County of Antrim sailed from London, England, January 18th, with 10,000 barrels of cement, consigned to Balfour, Guthrie & Co., clearing for San Pedro. On March 8th John M. Crawley, assistant general passenger and freight agent of the Southern Pacific Company, on behalf of Balfour, Guthrie & Co., made application to the Collector of Customs for permission to discharge the cargo of the County of Antrim at Santa Monica. The Collector referred the matter to the Secretary of the Treasury at Washington. A telegram was received by Collector Osborne from the Treasury Department, not only granting permission to the County of Antrim to discharge at Santa Monica, but extending the privileges to all vessels containing bulky goods, under the provisions of section 29, Act of Congress, approved June 25, 1884. This is a very important concession to Santa Monica, and while not conferring upon it the full dignity of a sub-port of entry, to all practical purposes it places it on an equality with any other port in legal facilities for the discharge of bulky cargo from foreign ports.

A NEW MARKET has been developed for the San Francisco merchants by the operation of the Oregon Pacific, Willamette Valley and Coast Railroad Company. For a long time the merchants of this city have had their business cut into by the encroachment of northern and southern railroad lines, but since a line of steamships to Yaquina bay, Or., and a railroad into Willamette valley, connecting with the Oregon route of the Southern Pacific Company, has been established, a large new field has been opened. While the San Francisco merchants have not fully realized the importance of the traffic, the business men of Portland have become quite exercised over it and are trying to get the Union Pacific and the Southern Pacific roads to make rates so as to compete with the new plan of the Oregon Pacific, Willamette Valley and Coast Railroad Company. This company has a lower rate from and to this city from the fertile Willamette valley by their railroad and steamship line. A meeting of the Merchants' Transportation Bureau was held in the Chamber of Commerce at Portland on March 20th to take steps to prevent the San Francisco merchants from entering into what they consider their territory, but this new railroad and steamship line is determined to meet any rate they can make in order that the San Francisco merchants may have a good chance to compete for the business of the Willamette valley and adjacent country. The steamship Willamette Valley leaves this port every few days, connecting with the Oregon Pacific Railroad to Corvallis and Albany. Here a further connection is made by river steamers to Portland by the same line, which gives an entrance into the eastern portions of Oregon and Washington. By a connection with the Oregon route merchandise is carried as far south as Ashland.

Money.

SAN FRANCISCO, April 3, 1893.

TO THE EDITOR:—Money is anything which has the quality of legal tender in payment of debt, and, in this point of view, we easily distinguish two kinds of money; firstly, coin of which the material is commercially equal to the amount of service which the coin represents; secondly, paper notes, intrinsically worth nothing. Our gold coin is an example of the first, barring the cost of coinage, and our greenback illustrates the second, barring the commercial value of the paper, which is insignificant. There is also an intermediate class consisting of coin having a more or less considerable intrinsic value, but materially less than the face value. In this position is our present silver coin, also our five-cent nickel and copper cent.

A gold eagle is in itself the guarantee of a return of the amount of service given for it; but a greenback is only the promise of such return. The silver dollar, with a present intrinsic value of about 63 cents, varying from day to day, is to that extent a guarantee and, as it is redeemable in gold, it is a promise to the extent of 37 cents, more or less. The nickel and copper coins are intrinsically worth far less than the face value, and there is no promise of redemption; but these are legal tender only in small amounts and, as they can be paid to the Government for postal service, and are not used in considerable transactions, their lack of intrinsic value is tolerated.

The value of the promise depends on the good faith and responsibility of the party making it, and, when confidence in either is impaired, such money suffers a discount to an extent which balances the fear of loss by the hope of gain. The discount on a legal tender promise may be disguised as a premium on good coin; this was the case with our greenbacks during the rebellion, or it may take the form of high prices and large wages, giving the illusion of good times, to be followed by a general collapse probably. Understanding these things, it is easy to perceive how an "inflated currency" of paper money may lead to widespread disaster by the failure to fulfill its promise. History records several instances of the kind. Our legal tender silver dollar would now be suffering the one or the other of these forms of discount were it not backed by the good faith and gold of a government in which we have confidence.

The public mind is full of fallacies on the subject of money; this is shown by such common sayings as "money makes the mare go," and "money makes money." Money does nothing. Labor and intelligence make money and all good things that we have, except such as are the free gift of nature, as land, air, water, etc. Money is neither a motor nor a creator, it is simply an instrument. I might say it is a lubricant, but all imagery is vain in treating of practical matters. It is well enough for a poet to say: "Her neck is like the swan," that may convey a very lucid idea to the enamored swain, though it is rank nonsense in fact. No woman's neck was ever like a swan, nor even like a swan's neck, and when we think about money as an adjunct of the social system, it is better to realize its true character than to invest it with imaginary qualities. Money is simply a convenient instrument, by the use of which we may exchange services without the necessity of finding the person who may happen to be prepared to render the precise kind of service which we may require in return for ours. For instance: I want a pair of trousers and I propose to pay for them by shoveling coal; but the tailor may not want coal shoveled, while the hotel-keeper may, so I shovel coal for the hotel man, he pays me money and I give that money to the tailor in exchange for a pair of trousers, and so on.

Another popular delusion is that the free spending of money condones its unjust acquisition. Thus, an English lord who derives a large income from his estate—that is, from the toil of others to whom he makes no return—is looked on as a benefactor if he employs many people to do nothing useful, and almost a saint if he also gives to useful workers an opportunity to earn over again a part of that which they or their fellows have already earned and given to him, under compulsion, for nothing. The one kind of lord whom Washington & Co. forgot to abolish—the very cream and essence of lordism, the *landlord*—may also be a good and useful citizen, but, as a *landlord*, he is a pauper, fed and clothed by other's toil, absolutely useless, and more burdensome than a dozen inmates of the poorhouse.

Counterpart to the above fallacy is the common idea that the rich man who does not spend his money is keeping it out of circulation, the truth being that few rich men keep large sums in hand. They usually deposit in a bank or—often if not in active business—buy bonds and other *promises* (called securities in financial slang), so that the money does actually circulate.

Many enthusiasts have thought, because they did not think enough, that intrinsic value of money might be dispensed with. They have imagined that it would suffice if the Government should issue paper money, not even pretending to redeem it ever, which, circulating from hand to hand, would answer every purpose. We are not civilized enough for that yet. We cannot trust our Governments quite so far, and all such experiments have brought disaster.

Yet I see no reason why we must be perpetually digging up gold and silver for money. Admitting the necessity for a metallic basis for the currency, why not make a given quantity of precious metal serve indefinitely, at least for use in our own country? Let the Government buy metal, pay for it with legal tender notes, coin it or cast it as ingots and keep it. We might require a billion or more dollars; what matter? The notes would pass at par; some of them would be lost by fire and other accidents, but that happens under the present system, to the great profit of bankers. At stated intervals let the notes be called in and replaced by a new issue; the lost notes would thus inure to the benefit of the Government—that is, of the

community instead of the bankers. The same gold would serve perpetually as the basis of the currency; it would not be worn away nor "sweated" as coin is now, nor lost utterly by shipwreck. The notes should be redeemable only on the demand of the nation.

For paying foreign countries, should we be foolish enough to buy more than we sell to them, which is quite needless, we might dig some more gold from the ground, but I fancy such notes would soon pass all over the civilized world. The saving of wear and tear of coin and pockets, of the cost of continual coinage and recoinage, the avoidance of absolute loss, since private losses by fire, etc., would all fall into the government, and the saving in labor and expense of transportation, would far more than compensate the cost of the notes. As a bulwark of safety to the government this plan would be vastly superior to a national debt, and it would impose no burden of taxation on the people as a debt does. In case of great emergency, as war, a special issue, similar to that of greenbacks could be made, to be replaced in due time by the gold notes as they should be gathered in as revenue, or otherwise paid. Of course there would be danger of counterfeiting, but we have that now, and I suspect it is as easy to counterfeit coin as notes. In this connection, I am surprised that some enterprising persons should not he (perhaps they are) making *genuine* standard silver dollars, absolutely equal and similar to the government dollar, at a profit of 30 per cent. It might be done in a foreign country, or on some remote island or mountain.

I propose to make a few remarks on the double standard next. C. H. AARON.

Jetty Harbors of the Pacific Coast.

At the last meeting of the American Society of Civil Engineers, Capt. Thos. W. Symons, U. S. Engineers, submitted a paper on the above subject. The Pacific Coast is generally high and rocky, and has few good harbors. The shore is formed largely of sands easily moved. From the southern limit of California to the northern limit of Washington, the length of shore line is 3120 miles, of which California possesses 1097; Oregon, 285, and Washington, 1738 miles, the latter including that of the islands in Washington and Puget Sounds. The slope of the ocean bottom near the land is about four fathoms per mile. On the Washington coast 100 fathoms depth is reached at about 20 miles from shore; on the Oregon coast at 10 miles, and along California at 6 miles. A depth of 1500 fathoms is reached at about 60 miles from shore, giving an average slope of 25 fathoms per mile.

The main ocean current off the coast is from the northwest, producing a reflex eddy current to the northward along the coast. Along some parts of the coast, but not all, this is continuous throughout the year. The prevailing summer winds are from the north and northwest, and the severe winter winds from the south and southwest. These cause currents near the shore in the same direction, extending seaward 16 to 50 miles, of 1 to 1½ miles per hour. The tides increase in range from 3.7 feet at San Diego, in the south, to 6.2 feet at the mouth of the Columbia. At the head of Budd's Inlet the range of tides reaches 18 to 20 feet.

The marked peculiarity of these tides is that in each lunar day there are two high and two low waters which are generally unequal in height and different in interval. They are called "lower low," "higher low," etc. From lower low the tide rises to the lower of the two high waters, then falls to a higher low water, rises to a higher high water, and then falls to the lower low water. Sometimes there is little difference between the "lower high" and "higher low," or practically no change for hours. The datum plane is a mean of the "lower low," and is about one foot below that of mean low water.

The rock along the coast is mostly sandstone, that in the projecting points being the harder. In addition to this source of sand, the coast range of mountains at about 20 miles from shore consists mostly of soft sandstone. The visible sand along the coast consists of dunes entirely destitute of vegetation; of others covered with driftwood, upon which a feeble growth exists, and large areas are exposed at low tide. A careful study of the movement of the sands must be made in every locality where improvements are projected. In some places, as at Coos bay, for example, the sand moves in a cycle, being first washed up on the spit, then dried and carried by the winds into the bay. The tidal currents sweep it out to sea and the waves throw it back on the bar, to again begin the round. The control of this movement by plant growth, while yet experimental, bids fair to accomplish much good.

Where the sand is heavy and coarse, the scouring of a channel through a bar is slow; but, on the contrary, when once formed, it is more stable than where the sand is light. The immense forests of the interior furnish great quantities of drift material, so that the whole North Pacific Coast is lined with it. Logs four to six feet diameter and 100 feet long are found intermingled with stumps and other forest debris. At the mouth of a drift-bearing stream, special precautions have to be taken to prevent injury to works in progress. At Port Orford, in Oregon, and San Pedro, in California, harbors are proposed for deep ships to be formed by breakwaters. Jetties have been, and are, under construction at other points.

The first jetty to be constructed on the Pacific Coast was at Yaquina bay, a narrow estuary, 20 miles long, and 115 miles south of the Columbia river; its tidal area is five square miles, and its drainage area 262 square miles. The average height of tide is seven feet, and the maximum range 11 feet. The mean outflow of tide at ebb is 32,000 cubic feet per second, and the channel, carrying seven feet at low tide across the bar, was constantly shifting in position. A quarter of a mile out from the bar is a reef of rocks which broke the swell and acted as a breakwater. The depth inside was four to five fathoms. Examinations

by boring showed that the maximum depth to be expected by scour was 18 feet. The heavy waves of winter assume a motion of translation at depths of eight to ten fathoms, and carry great masses of sand shoreward.

The plan of improvement adopted was to construct two jetties 2300 feet apart at the harbor throat, and converging to 1000 feet at deep water, the north one being 3600 feet and the south one 2300 feet long. These were so located as to deflect the channel to the south of the reef. The jetties are rubble mounds reaching to high water. The south jetty was built on brush mattresses four feet thick, resting on sand, and the north one on the rockbed. A tramway was carried on a trestle, and an interesting feature was the use of a revolving pile-driver, which could drive piles 15 feet in advance. The mattresses were of brush fascines and pole-bound together, and were constructed underneath the tramway tracks and around the piles, loaded with stone and sunk. The sinking of piles in sand is now done entirely by the hydraulic method. The total cost of the jetties was about \$90 per lineal foot.

The result reached has been to double the low-water depth on the bar and maintain it in a good location; the least depth in a year has been 14 to 15 feet. Outside of the channel, against the jetties, great quantities of sand have accumulated. It was only when both jetties were completed that permanency ensued in the channel, as before the north jetty was completed the channel wandered greatly.

At the mouth of the Columbia river the work is about completed, and the largest vessels can now sail in and out easily. The bar extends in a curve convex to the sea, with its vertex four miles out. Inside, there were shoals and sand islands among which the channel ran, with a depth on the bar of 19 to 27 feet. The estimated mean tidal discharge is 1,000,000 cubic feet per second. The fresh-water discharge from the river is 90,000 feet at low water, and 600,000 when the river is high. A jetty, four and three-fourths miles long, consisting of a rubble mound built on mattresses three feet thick and 40 feet wide, was built up to low water, to concentrate the water of the river within a moderate width, and discharge it as a unit to the sea. The result has been to increase the depth at low water to 29 feet in a single channel, thus far permanent, which is 1300 feet wide; at 27 feet depth it is one mile wide. The jetty has cost \$83 per lineal foot. The jetty, while called a low-tide jetty, has really been built four feet higher, to allow for subsidence.

Other works were described, including Wilmington harbor, Cal., Coos bay, Humboldt bay and Coquille river. The paper went into details of construction, the methods of carrying on the work, the use of quoins to prevent undermining, and the relative advantages of low and high jetties, the latter being considered generally preferable.

The Marshall Nugget at the World's Fair.

CHICAGO, ILL., March 14, 1893.

TO THE EDITOR:—After a trip through southern California, basking in its heavenly climate, and drinking in its beauties, transformed to the snow and slush covered streets of Chicago, was anything but pleasant. This morning, so delightful in San Francisco, to say nothing of lovely Redlands, Riverside and Santa Anita, the air is full of driving snow, and you may believe I am glad that I can remain indoors. I can give your readers no news obtained by personal observation in regard to the fair grounds and the progress being made there for astonishing the people of the world. That the coming exposition is to be grand beyond anything imaginable, there can be no doubt.

I learn that the California Commission has assigned the glass case at the foot of the Marshall Monument, erected in the Mining Department of the California Building, to Judge W. W. Allen for the exhibit of the first nugget of gold picked up by James W. Marshall in the mill-race at Coloma, Jan. 19, 1848. It is a graceful acknowledgment to all the the world that California accords all the credit for the discovery of gold to Marshall. The exhibit will be in fine shape, and the wonder of the visitors will be that so small a chunk of gold could have wrought such wonderful results.

I will send you a detailed report after I have been to the fair grounds and seen what is being done, and I assure you I will not risk that until the weather is more like that you enjoy than it is now. R. B. AVERY.

BIDS for work on the breakwater, which has been in course of construction at San Luis Obispo harbor for four years past, were opened this week by Lieutenant Colonel W. H. H. Benyard of the corps of government engineers. The breakwater, according to the plans originally adopted, is to run out from Point St. Luis, on Whalers reef, to a length of 2400 feet. The breakwater has already been constructed 600 feet out over the reef. The bids opened were from Robert Tibbets for \$3 60 per ton for rock; Patrick O'Neill, \$2.77 per ton, and Albert Polhemus, \$1.94 per ton. Lieutenant Colonel Benyard has recommended that Polhemus be awarded the contract, and he will probably get the job. The appropriation to be used is \$28,000, which, at \$1.94 per ton, will permit the purchase and delivery of 15,000 tons of rock. It is estimated that this amount will extend the breakwater 400 feet, or a total length of 1000 feet. Mr. Polhemus is a San Diego contractor.

THE Castle Crag of Soda Creek Railroad, Shasta Co., now completed four miles, will be pushed on to Bartle on the upper McCloud, and the splendid new sawmill there which has remained idle for a year will be started up, and a big lot of sugar pine logs piled up will be slashed up at a rapid rate. The Company's mill at Castle Crag will be run to its full capacity and more power added, and perhaps a new mill will be put somewhere on the line of the railroad. The McCloud pines will soon be the scene of great stir and activity.

The Lease or Tribute System of Mining.

The following is an abstract of a paper by Benjamin B. Lawrence, Denver, Colo., presented at the Montreal meeting of the American Institute of Mining Engineers:

The lease system is the gradual result of the development of our larger producing mines throughout the State of Colorado. The operation of a mine, or group of mines, by corporations has been attended, in many cases, by disaster, owing to the difficulty of securing a day's work from the men employed in the mine, the loss entailed by careless mining and sorting of high-grade ores, and by lax or inefficient management on the part of superintendents and foremen.

Given, therefore, a mine that has been practically abandoned by its owners for the reasons given, but still possessing merit, the lessee appears on the ground and secures a lease for a year, or term of years, from the owner or owners, paying them a royalty upon the gross smelter or mill returns of the ore which he mines. In this way, many of our abandoned mines have been reopened by the miner, who, with two or more of his associates, has been enabled by careful attention to obtain profitable results.

This procedure led to the leasing of portions of a mine to different lessees, the mine still remaining under the control of the owner or owners. The lease system is now largely in force in Clear Creek and Lake counties, and, in order that its workings may be clearly understood, we will cite the instance of a well-known mine in Georgetown, Clear Creek county. This property is owned and operated by Mr. G. under the lease system, and his methods have proved so successful that his example may be followed with profit by many other mines of this description.

The lessee applies for a lease, we will say, upon a block of ground in level "C." This block of ground is the extension of drift "C" for 100 feet, which he drives at his own expense, the owner furnishing the necessary supplies, powder, fuse and candles, the lessee paying for these and for hoisting the ore and dirt and all other necessary expenses incident to the handling of the ore. The terms of the lessee are that he should drive a level 100 feet, and have the privilege of back-stopping this ground to the level above. The royalty which he pays to the owner of the property depends upon what the ground immediately behind, above and below him has yielded, if it has been opened, and varies from 25 to 33½ per cent. Should the level have been contracted for and driven by the owner, and this 100 feet of back show ore in paying quantities, the lessee pays a royalty of from 33½ to 75 per cent of the gross smelter returns.

By this method the owner develops his mine at little or no cost to himself, the lessee driving levels, sinking winzes, etc., in order that he may open stoping ground. It is evident that, under this method, the owner takes little or no risk, and is assured of profit if ore is found. The lessees are under full control of the foreman of the mine, and are subject to the same rules as would govern them if under day's pay.

By dividing a mine up into blocks of ground, varying from 50 to 100 feet in length by the distance between the levels, each lessee works his own particular block of ground, the ore being kept separate, and, when delivered on the dump, becomes the property of the lessor or owner of the mine. The ore is then shipped to the nearest sampling works and its value ascertained, the lessee paying the cost of the control sample.

The advantages of this system as applied to the mines of Clear Creek county, over the day's-pay plan, may be briefly summarized as follows:

1. The mine once opened can be operated with a small working capital.
2. The percentage of profits received from the sale of ore are absolutely net, the lessee paying all costs of mining, hauling, etc.
3. As a lessee is interested directly in the ore which he mines, he will take care that none is lost, either in the mine or in sorting it. As the ore of this district will average at least \$200 a ton, and many rich specimens are found, it also precludes the danger to all mine owners of the small speculations by employees.
4. Under the lease system the mine is not liable for lien.
5. The lessee is responsible to the owner of the mine for carelessness of any kind which may result in damage to the mine or accident to men working therein. Under day's pay the owner is responsible to his employees.
6. But little supervision of the men is necessary under ground. They will all do a day's work under the lease system, as they are working for themselves, and a man will work harder for himself than for any one else. The opportunities in a mine for shirking work are perfectly understood by both employer and employees.
7. Economy in the use of supplies of all kinds. Under day's pay a miner will use almost twice as much powder as under the lease system.
8. Miners will take great chances to find pay ore. Development will therefore cost little, as every miner working in a mine is interested in its product and the opening of new ground; he is familiar with the mine, and the owner has the benefit of his experience in finding ore, which may often baffle the keenest manager and foreman.

The system has proved an undoubted success in the leading mines of Clear Creek county, and is now being rapidly introduced into the other camps of the State, notably in Leadville and Aspen, as its working is capable of being so adjusted as to suit the character of the mine.

It is often necessary, should the mine be in poor ground, to encourage the lessee by what is known as allowance of footage, which means an allowance of, we will say, \$2 a foot to drive a drift, which, under day's pay or contract, would cost \$7 a foot, giving him the privilege of leasing the ground which he opens up. With ample working capital, given a non-productive mine which it is proposed to develop, it is advisable to open the property under contract, leasing the stoping only. The royalties, as has been

stated, which rule in Clear Creek county, vary from 25 per cent to 75 per cent of the gross mill returns.

It is the popular belief that only those mines which have failed under corporate management are worked under this system, and also that in leasing a mine you are practically "gouging" or destroying it as a workable property. This belief is entirely erroneous, as this system is now applied to some of our best producing mines, and they can be kept in as good condition under the lease system as under day's pay or other plan. The men leasing blocks of ground in this way do not obtain any more privileges than if they were employed by day's pay. The system is recommended to the careful attention of all mine operators.

Electrical Shot Firing in Mines.

Following is an abstract of a paper read before the Southwestern Branch of the National Association of Colliery Managers of Great Britain, by F. Brain:

About 150 years ago Benjamin Franklin first proposed that a spark from an electric machine should be used for firing a cartridge of gunpowder. It was not, however, until 1835 that this proposition was adopted and applied practically. Between 1835 and 1840 some very useful work was done by Sir Charles Pasly with electric exploders, in blasting the hulks of wrecked vessels on the British coast. In those days a Daniell and afterward a Grove and a Bunsen battery was used. These have subsequently given place to the Leclanche battery. In all these cases the current of electricity is of low tension, and the exploding apparatus is bulky. Recognizing the necessity of having an instrument that takes up much less space and is much lighter, electricians have devoted a good deal of attention during recent years in inventing high tension apparatus that would be easy to carry about, especially in mines and rock excavations. Most of these consist of ebonite friction plates with suitable collectors and condensers, but the latest type consists of small magneto-electric machines. The fuses used with the high and low tension currents are naturally quite different from one another. The low tension fuse consists of two copper terminals, fixed at a certain distance apart by an ebonite head and connected by a fine platinum wire. This platinum bridge is embedded in fine gunpowder or other explosive, and inclosed in a cup. The head thus prepared is inclosed in a detonating cap containing a small amount of fulminate of mercury, and this in turn is inserted in whatever explosive it is desired to fire. In the high tension fuse the bridge of fine wire is dispensed with, and in its place is used a sensitive chemical composition which explodes on the passage of the electric current through it. The high tension generator presents another advantage over the low tension apparatus, because it is much surer in its effect. A chemical battery is irregular in its action owing to polarization, and it is usually necessary to test it before each firing. This, of course is dangerous. A high tension generator is, however, almost certain in its action, and there is therefore no need to test it. A high tension apparatus, for firing one or two shots, measures 6½ in. by 5½ in. by 5½ in. and weighs 5¾ lbs.

The use of electric fuses is highly necessary in mines where there is any firedamp. During recent years many flameless explosives, such as roburite and tonite have been largely adopted in place of gunpowder in fiery mines, but the charges in most cases were at first, and in many cases still are, ignited, by the ordinary time fuse. This is really just as dangerous as if a gunpowder charge were used. An electrically ignited fuse is the only really safe exploder for a fiery mine. It is also extremely useful when several shots are to be fired simultaneously. It is also safer, because while the time fuse can hang fire, an electric fuse never does, and thus accidents cannot occur from workmen going to replace an apparently ineffective fuse.

Very great exactness is necessary in all operations connected with electric shot firing. The instructions given by the Electric Blasting Apparatus company, with its magneto-electric exploders, will therefore be of considerable interest.

Charging.—In charging a shot hole, great care should be exercised; 1st, that the electric detonator is inserted and secured in the explosive; 2d, that the fuse wires are kept straight from the explosive charge along the side of the shot holes; 3d, that the tamping used is not of a gritty or cutting nature; 4th, that the leading wires are not abraded, kinked or otherwise damaged during ramming; 5th, that the joints between the ends of the fuse wire and the ends of the firing cable are perfectly made by the copper wires being quite clean, bare and well twisted together; 6th, that the ends of the firing cable connected to the terminals of the exploder are clean, bare and firmly screwed down.

Firing.—In firing a shot great care must be exercised; 1st, that the firing cable wires are not connected to the terminals of the battery while any workman is at the face, while the shot hole is being charged, or while the fuse wires are being connected; 2d, that the operator's hands do not touch the terminals of the exploder; 3d, that the handle of the exploder is turned with a firm, quick action three or four complete revolutions and then—and not till then—while still keeping up the speed, the knob firmly pressed to fire the charge. The strength of the current mainly depends on the speed of the handle.

Faults.—1st, the constant use of the cables causes the insulation to become rubbed off and a short circuit is the result; 2d, the wires sometimes get injured in tamping; 3d, the fuses are often faulty by damp and are sometimes not adapted to the particular shot to be fired.

Connecting.—Where several fuses are being fired simultaneously, they should be connected in parallel, and not in series.

Conditions.—The form of exploders, cable, fuses, etc., depends on; 1st, the explosive used; 2d, the length of firing; 3d, the length of fuse wires; 4th, the conditions of working, whether the holes are wet or dry, whether a pit is being sunk, a heading made, or the coal face being worked.

Magnets.—With magneto-electric exploders, the magnet gradually gets weaker, and should be tested by hand or voltmeter from time to time.

Some Misconceptions Concerning Asbestos.

During the past decade the uses of asbestos have become widely extended, and consequently brought to the knowledge of the great majority of those who live within range of our industrial centers. As a result of the wide applications of this substance, and of the interest excited in the minds of many by a "stone" which may be teased out into a fluffy mass resembling silk or cotton, there has arisen a somewhat extensive literature of asbestos. This is scattered through geological, chemical, technical, and even religious publications, while there have appeared one or two not unpretentious volumes devoted entirely to this mineral. In these there are frequent statements which clearly indicate that the writers entertained serious misconceptions, and to call attention to some of these is the object of this paper.

1. There is a misconception as to the mineralogical character of asbestos, and this has arisen from the use of the name in a somewhat generic sense. Dana in his "Mineralogy" says that asbestos is a finely fibrous form of hornblende, but that much that is so called is fibrous serpentine. This statement seems to divide many of our writers into two camps, the one calling the mineral a variety of hornblende, the other proclaiming its serpentine character.

The Canadian province of Quebec produces, it is estimated about 85% of the world's supply, the balance coming principally from Italy. The products of these two countries are known the world over as asbestos, and it is not unreasonable, therefore, to ask that they be allowed to appropriate the name, even though they be of other composition than the mineral to which mineralogists originally applied the term, and that other minerals, if such there be, used for similar purposes, be otherwise designated.

The asbestos of commerce is a hydrated magnesian silicate of the same composition as ordinary serpentine rock; in other words, it is fibrous serpentine. It is curious to note, however, that the Canadian miners working continually among serpentine and nothing else have fallen upon the word hornblende, and apply it to a very coarsely fibrous and polished serpentine, such as is often met with along lines of faulting.

2. The second misconception is in reality but a special case of the first; it is to the effect that Canadian and Italian asbestos are different minerals. In the early days of the asbestos industry Italy was the only source of supply, and immediately prior to the discovery of the Canadian deposits a powerful company had been formed and had succeeded in bringing under one control the numerous small mines of the Italian district. Under the circumstances, it is not to be wondered at that the Canadian fiber found no favor in the eyes of the owners of the Italian mines. The Canadian mineral was declared to be far inferior to the Italian; the latter, it was maintained, is true asbestos, while the former is only fibrous serpentine. As a matter of fact, the two minerals are practically of the same composition, as is shown by the following results of analysis of fair samples recently made by myself: Italian—Silica, 40.30; magnesia, 43.37; ferrous oxide, .87; alumina, 2.27; water, 12.72; total, 100.53. Canadian—Silica, 40.57; magnesia, 41.50; ferrous oxide, 2.81; alumina, .90; water, 13.55; total, 99.33.

Canadian asbestos has largely displaced the Italian, not because of difference in composition, but by reason of the greater ease with which the former can be wrought into the various forms required in the arts.

3. The third misconception is that asbestos is in nowise affected by heat. This is set forth in such statements as "temperatures of 2000° to 3000° are easily withstood," and "a mineral which has been successfully exposed to a heat of 4500° to 5000° Fahr." Now, what are the facts of the case? It is true that asbestos is infusible except at very high temperatures, but it is equally true that only a very moderate degree of heat, heating to low redness in a platinum crucible, for instance, is required to entirely destroy the flexibility of the fiber and render it so brittle that it may be crumbled between thumb and finger as readily as a piece of biscuit. In this connection, one is reminded that the ancients are said to have possessed asbestos napkins which they cleansed by means of fire, and that Charlemagne in like manner cleansed his tablecloth, to the delight of his warrior guests. It is not improbable that these statements are to a large extent mythical; certainly, if true, the articles in question were not made of asbestos, the hydrated magnesian silicate.

4. The fourth misconception is that asbestos is possessed of high non-conducting qualities. This is perhaps the gravest and most widely spread of the several misconceptions, and is held by many who should know better. As an example of the manner in which this last misconception is set forth I may cite the following from an address of a well-known geologist: "Among the most important properties of asbestos is that of non-conductivity or its power of resisting the action of heat." Here we have the misconception clearly stated; it is that because asbestos is infusible it must of necessity be a good non-conductor. The truth is that asbestos itself is a very poor non-conductor, as any one may prove by placing a vessel of water on a sheet of asbestos cardboard and applying heat from below, or, more simply still, by placing a piece of wood on a sheet of asbestos millboard on a hot stove. If, however, asbestos is teased out and worked into a fluffy mass, we then obtain a non-conducting material, but it is the air inclosed by the fibers that is the real non-conductor, the asbestos serving simply to entangle the air. The use of asbestos in the manufacture of non-conducting coverings for boilers, etc., is due to its fibrous texture and its infusibility. The latter property gives it a decided advantage over hair and other fibrous materials which char under continued exposure to heat, while the exceeding flexibility of its fibers gives it a like decided advantage over mineral wool and other fibrous but brittle mineral substances.

The removal of the misconceptions to which attention has been called will in no respect tend to decrease the uses

of asbestos, for the mineral has a sufficiency of good quality of its own to maintain and increase the demand; while, on the other hand, a true conception of its nature and properties will prevent its use under conditions where only disappointment can follow; a circumstance which in the end would tend to bring discredit upon a most valuable mineral.—J. T. Donald in *Engineering and Mining Journal*.

The Trotter.

The odium that once justly or unjustly attached to the trotting horse breeding industry has, under the modern influences which have surrounded it, and by reason of a greater public interest and, consequently, a better acquaintanceship, so entirely disappeared as to be now little more than a memory. The terms, "fast horses," "horse racing," etc., were practical synonyms for loose morals, gambling and general wickedness. In those old days the goody-good moralists were absolutely certain that the trotting horse and his master were under the direct management of his satanic majesty, who, it was believed, made no other use of them than to contaminate the good morals of the children of earth. The race track was the devil's favorite playground. Much of this was the result of the densest ignorance on the part of the pharisaical critics, who were so blinded by prejudice and the bias of early and faulty training that they were unable to distinguish the good things from the greater of lesser that was undoubtedly connected with the industry. But step by step the bad has been compelled to give place to the higher and better, until now, while not pretending it is absolutely free from corruption any more than any other commercial industry, we present the light harness-horse breeding industry to the world as being strictly moral, legitimate and high-toned, and last, but not least, profitable. Men can make evil of anything, but the light harness-horse industry has called to its support, and is calling, such a class of men as make it probable that in the aggregate no other branch of commercial activity is represented in morals, intelligence and enterprise in a more satisfactory manner than it. Such has been the revolution of feeling in this direction that judges of our supreme courts, members of the national senate, members of the cabinet, scholars, statesmen and capitalists form a very considerable portion of its active membership. Ministers of the gospel as a class, are well represented, and it is no longer a rare thing to see a horse paper ornamenting a preacher's study table. They do not propose letting the devil have all the good things. All this is highly pleasing, and matter for sincere congratulation; but the good is not complete. Like every other business, there are certain wrongs and evils which must be daily combated and righted to insure the desired ends, and as the ultimate life and success of this broad industry rests almost entirely in the proportion of strict right and business principles upon which it is as a business conducted, the search-light need to be turned into the sulky, into the judges' stand, into the sale ring, upon the pedigree-maker and the pool-box, and the legend, "Drop a sum of money in the slot and see the light go out," must be taken down at once; the signs point to this end. It is now a rare thing to meet a breeder who misrepresents his stock; on the contrary, it is the rule for the purchaser to be agreeably disappointed. This is wise and means that the breeders and turfmen are rapidly focusing to a point where the platform shall be "an honorable business, honestly conducted."—Clark's Horse Review.

The Value of Trade Journals.

The trouble with a great many advertisers in trade journals is that they expect too much. They expect the advertisement to do more work than their best travelers, whose expenses are as much in one week as the yearly cost of the advertisement. As a rule, no attention by the advertiser is given to the advertisement except perhaps a change of wording once in six months. Speak to your customers through it the same as your traveler would talk to them, and you will soon discover that the trade paper is the only medium. The publisher of the best journal in existence can only sell you space and guarantee circulation among your probable buyers. He cannot guarantee that the advertisement will pay you. That rests with yourself. You must use the space to your best advantage, and last, but not least, do not give your travelers all the credit for the year's business. Another mistake is that advertisers look too much for cheap advertising. When you are sick do you look around for the cheapest doctor? Or, if you want to engage a lawyer, do you look for the low-priced and most obscure? Certainly not. The best evidence of the value of a paper as an advertising medium is its ability to secure and hold the best-paying class of advertisements.

BRITISH COAL AND METALLIFEROUS MINES IN 1892.—

A return just issued shows the number of mines at work under the Coal and Metalliferous Mines Acts in each inspection district, the number of persons employed in and about the mines, and the tonnage of mineral obtained therefrom during 12 months. In the Yorkshire and Lincolnshire district, comprising Yorkshire (exclusive of the North Riding) and Lincolnshire, 404 mines were at work under the Coal Mines Act, employing 67,804 persons underground, 14,361 above ground, and 2530 on private railways and washing and coking coal. These wrought 23,313,506 tons. In the Durham district, including the North Riding, there were 225 mines at work, employing 57,994 persons underground, 14,278 above ground, and 5015 upon private railways and washing and coking coal. The number of tons wrought was 26,892,804. Under the Metalliferous Mines Acts, in the Yorkshire (exclusive of the North Riding) and Lincolnshire district, there were 56 mines at work, employing 353 persons underground and 541 above ground. The minerals wrought amounted to 57,649 tons, and 1,138,092

tons not coming within the scope of the Acts. In the Durham and the North Riding there were 80 mines at work, employing 1349 persons underground and 1385 above ground. These wrought 97,553 tons of minerals, and 253,912 tons of minerals from open work not coming within the scope of the Acts. In the United Kingdom there were 3439 mines at work under the Coal Mines Act. These employed 536,091 persons underground, 112,359 above ground, and 19,533 upon private railways and washing and coking coal. The quantity obtained was 197,693,592 tons. Under the Metalliferous Mines Acts there were 1189 at work, employing 23,098 underground and 16,330 above ground. These obtained 4,000,397 tons of minerals, and 5,792,519 tons from open works not coming within the scope of these Acts.

The New School Law.

The following are extracts from the new school law passed by the late legislature:

The County Superintendent must apportion the school moneys to each district four times a year. Balances (where eight months' school has not been maintained) must be placed to credit of unapportioned County Fund and be reapportioned.

Districts lapse when there is an average daily attendance of five, or less than five pupils, during the whole school year.

County Superintendent has power to issue temporary certificates.

County Superintendent must approve or reject all plans for schoolhouses. Trustees must submit plans for his approval.

New school districts shall not be formed at any other time than between the first day of December and the fifth day of April.

Boundaries of a school district can be changed only between the first day of January and the fifth day of April upon petition to County Superintendent.

Schools must be opened in new districts not later than the second Monday in September, in the year in which the order for its creation was made by the Board of Supervisors, otherwise the order has no effect.

Election for School Trustees must be held on the first Friday in June.

When a School Trustee resigns, it must be in writing, and sent to County Superintendent.

Trustees must make no contracts with employees to extend beyond June 30th.

Trustees must appoint a Census Marshal on or before the first day of April.

Census Marshal must take the school census between the fifteenth and thirtieth days of April.

All orders of Trustees for books and apparatus must, in every case, be submitted to the County Superintendent for his approval before said books or apparatus shall be purchased.

The Library Fund consists of not less than five, nor more than ten, per cent of the County Fund, annually apportioned. It must not exceed \$50. Trustees must, in the month of July in each year, notify the County Superintendent what amount they desire to be apportioned for their respective districts for the year.

All of the present County Boards of Education in the State were legislated out of office, and it was made the duty of Boards of Supervisors to appoint four members at the June meeting and designate the two who are to hold two years and the two members who are to serve one year.

County Boards of Education must, at their first meeting subsequent to July 1st, annually, organize and elect a President.

County Board of Education may issue certificates of these grades, to wit:

High School certificates, valid for six years.

Primary certificates, valid for two years.

Special certificates, valid for six years.

Holders of California Life, Educational and Normal diplomas, who present their diplomas to the County Superintendent and have their names recorded in his office, are not required to file their certificates before assuming charge of a school.

No books other than those published by the State can be adopted or used as text books in the subjects of reading, orthography, English grammar, arithmetic, geography, U. S. history, physiology and civil government in the public schools. High Schools are exempt from the above requirements.

There shall be no construction to permit the adoption of any text books upon any subject covered by the State series.

There are many and various conditions upon which Educational, Life and Normal diplomas, and so forth, may be issued by County Boards, too extensive to be here enumerated.

The High School laws have been revised and amended to meet requirements of such schools. In Union High School districts, provision is made for building, levying taxes, maintaining school election and organizing of offices, admission of other districts and various other matters. County High Schools are entirely under the control and management of the County Board of Education.

All proceedings for establishment of County and High Schools, prior to passage of the present law, are validated. The Act takes effect from and after its passage.

THE United States Supreme Court has given a strict construction to the eight-hour law. Any work done on Sunday, and all work done on other days in excess of the eight-hour limit, entitles the worker to extra pay. The deficit of one day cannot be charged against the excess of another day in order to make an average of eight hours. Each day must be separately accounted for, and all work in excess of eight hours entitles the employee to extra compensation. The advocates of the eight-hour system could hardly ask for anything more to their taste than this final decision.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

Continental Combination Can Co., S. F. Capital stock, \$300,000. Directors—George A. Moore, H. C. Hunter, A. C. Shattuck, Robert B. Bain and Robert B. Hume.

Graltney Hardware and Implement Co., Escondido, San Diego county. Capital stock, \$15,000. Directors—H. C. Graltney, George T. Hawley, George M. Hawley, H. G. Myers and H. S. Cliff.

American Colony, Canal and Irrigation Co., Easton, Fresno county. Capital stock, \$28,800. Directors—Robert Smith, E. M. Still, George T. Wright, James McChirry and F. C. Shumarel.

Gladyata Water Co., Redlands, San Bernardino county. Capital stock, \$50,000. Directors—E. G. Judson, R. J. Waters, A. E. Sterling, R. E. Archer and C. E. Fish.

American Invention Improvement Co., S. F. Capital stock, \$1,000,000. Directors—J. K. Bigelow, L. M. Bigelow, E. Gardner, D. M. Curtiss and C. E. Gunn.

Modesto Warehouse Co., Modesto, Stanislaus county. Capital stock, \$50,000. Directors—A. L. Cressey, F. A. Cressey, J. R. Broughton, H. P. Weyer and C. M. Maze.

The Mokelumne Water Co., Lodi, San Joaquin county. Capital stock, \$50,000. Directors—J. R. Bothwell, C. F. Copeland, F. S. Chadbourne, T. W. Newell and S. D. Woods.

San Francisco Wine and Liquor Co., S. F. Capital stock, \$20,000. Directors—I. S. Rosenbaum, S. H. Rosenbaum, Henry Falkenstein, R. H. Putzman and Helen Rosenbaum.

Madera Electric Light Co., Madera, Fresno county. Capital stock, \$100,000. Directors—D. M. Tomblin, Sol. Lazare, R. L. Hargrave, O. B. Gannyard and J. E. Newman.

Montecito Creek Water Co., Santa Barbara. Capital stock, \$25,000. Directors—E. H. Sawyer, E. S. Sheffield, T. P. Izard, E. B. Hall and A. Magee.

Los Angeles and San Diego Steamship Co., Los Angeles. Capital stock, \$500,000. Directors—Wm. B. Arkey, A. B. Smith, Geo. N. Nolan, A. A. True and C. W. Hunt.

Saint Mary's Electric Damper and Pressure Regulator Co., S. F. Capital stock, \$4,000,000. Directors—Joseph St. Mary, H. W. Chase, W. C. Starr, J. P. Moore and John Collier.

Needles Land and Cattle Co., Needles, San Bernardino county. Capital stock, \$50,000. Directors—T. L. Blackburn, F. Monaghan, Daniel Murphy, G. S. Briggs and George Nay.

Evans Extension Ditch Co., Visalia, Tulare county. Capital stock, \$54,400. Directors—W. H. Hammond, W. G. Penneaker, J. W. Thomas, R. E. Hyde, H. C. Ray, J. C. Ward and J. W. Fewell.

Jeffress, Mitchell, Tutt Co., Oakland. Capital stock, \$150,000. Directors—M. J. Mitchell, Geo. H. Jeffress, E. R. Tutt, J. C. Buttner and James Graham.

Alamitos Oyster Co., Long Beach, Los Angeles county. Capital stock, \$25,000. Directors—J. Bixby, J. McGarvin, A. L. Lovett, J. W. McGarvin and W. F. Sweeney.

Crescent Oil Co., Los Angeles. Capital stock, \$25,000. Directors—C. J. Hutchins, H. C. Converse, E. S. Lockwood, W. B. Nicholson and E. T. Wright.

Mohave Cattle Co. Capital stock, \$50,000. Directors—Paul Breon, Henry Lambert, Daniel Murphy, George H. Wheaton and George W. Harnold.

Indianapolis Furniture Co. Capital stock, \$100,000. Directors—Charles Wollpert, John Nightingale Jr., Hamilton Page, Ernest Roach and G. F. Ochs.

Bernhard Mattress Co. Capital stock, \$50,000. Directors—Joseph Bernhard, Samuel Bernhard, Henry Bernhard, Louis Bernhard and George W. Van Worst.

Wallowa Developing Co. Location of mines, Oregon. Capital stock, \$500,000. Directors—Scott E. King, Frank J. Lease, J. W. Pew, Francis Avery and W. H. Dinsmore.

Automatic Novelty Manufacturing Co. Capital stock, \$100,000. Directors—Fred Bangerter, John H. Greefken, Richard Derby, Richard Stevenson and John Derby.

United States Indicator Co. Capital stock, \$1,000,000. Directors—Henry G. Krasky, A. M. Loryea, A. R. Otter, G. H. Lehman and A. B. Murray.

Newfield Co. Object, the sale of machinery, implements, farm and lumber lands, etc. Capital stock, \$50,000. Directors—Aaron Newfield, Marcus Newfield, Philip Kahn, Sarah Newfield and Hannah Newfield.

George Detrick Co. Capital stock, \$50,000. Directors—Edington Detrick, Timothy J. Lyons, Edington Detrick Jr., George F. Detrick and Charles R. Detrick.

Sites Sandstone Co. Capital stock, \$500,000. Directors—David O'Neil, Charles O. Alexander, Augustus Abbott, John C. Quinn and William R. Jones.

St. George Gold Mining Co. Object, to reduce gold and silver-bearing ores in Vanderbilt district, San Bernardino county. Capital stock, \$10,000,000. Directors—James L. Flood, George R. Wells, William S. Lyle, John W. Mackay and James E. Walsh.

Gold Bar Mining Co., Vanderbilt, San Bernardino county. Capital stock, \$10,000,000. Directors—J. L. Flood, Geo. R. Wells, W. S. Lyle, J. W. Mackay and James E. Walsh.

El Rey de Oro Co., Vanderbilt, San Bernardino county. Capital stock, \$10,000,000. Directors—J. L. Flood, G. R. Wells, W. S. Lyle, J. W. Mackay and James E. Walsh.

Hoboken Gravel Mining Co. Directors—Martin Jones, Samuel L. Theller, J. S. Finch, B. W. Bates and Sylvester Gardner.

Art Brass Works. Directors—M. A. Cahn, J. W. Burtchall, P. E. Barker, A. Cahn and Joseph Naphaly. Capital stock, \$25,000.

Scott Billiard Table Company. Directors, A. E. Scott, J. W. Wright, John F. Nolan, John T. Bryne and C. H. Hirst. Capital stock, \$100,000.

AT SELBY'S last week a big bar of gold was received. It came from the Harqua Hala Bonanza and Golden Eagle Mining and Milling Company's mine in Yuma county, Ariz. The weight of the bar is 379 pounds avoirdupois and 5527 ounces Troy weight. It measured 5½x13¼ inches on top and 6½x15 inches on the bottom, and was 8 inches high. The value was \$96,169 80. This was the output of a 30-stamp mill for 54 days. The mine belongs to Hubbard & Bowers.

IN the suit of John Doe against the Waterloo Mining Company, on trial in the Los Angeles United States Court, involving title to disputed ground in mining claims at Calico, Judge Ross rendered a verdict for the plaintiff. Several suits are involved and are practically settled by this decision, in which several hundred thousand dollars in damages were claimed. The case had been contested in the courts for several years.

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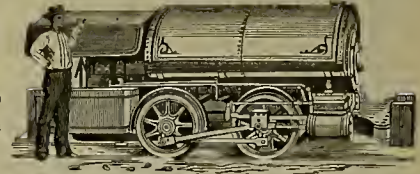
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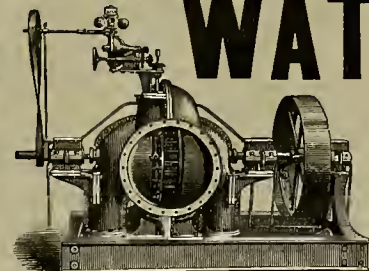
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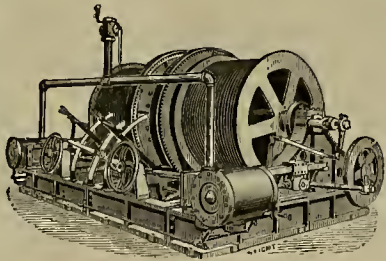
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The Apparent Growth of Gold.

Of the many myths prevalent regarding gold, the greatest one of all is its growth. Of course there are many interesting instances where ancient worked-out galleries in mines are slowly closing up by the incrustation process, so that space long ago excavated is being filled with an accumulation resulting from the oercolation of water through the adjacent wall rock. This water has in chemical combination such minerals as iron, copper, sulphur, and the precious metals, which are deposited in the open crevice, making for a second time a mineralized body which will show by analysis the above-named and many more minerals. In fact, I have had this actual experience resultant on the examination of an old gold mine in Honduras, Central America, that had been worked some time prior to any history we have of that country. This circumstance gave to the natives the idea that gold grew, and they so expressed themselves; while it seemed in the case of one individual a transmutation idea had permeated his head, for he explained that the green carbonate of copper was undergoing a change into silver, while the silver in turn would develop into gold.

In India I found a caste of mining people who believed that gold grew in the bottom of the large lakes situated in that country. They expressed no practical reason other than fairy-tale superstitions; and even in this country there are converts to the idea. I was much amused and interested some years ago to hear an intelligent acquaintance maintain in strong and not altogether religious terms that "the stuff grew and he knew it." His experience was based on the fact that in a certain pile of tailings, resulting from the milling of heavy sulphuretted gold ores, he had treated at one time several tons with no result. Again, in three years time, he discovered by a pan test that the same pile had gold in it, whereupon he treated several tons, with the approximate result of one dollar per ton. After this last treatment he declared the tailings were barren of gold so far as he could detect by the mechanical means at hand. In order to convince him I selected an average sample, which on assay gave 2 pennyweights 20 grains gold per 2000-pound ton. This was considered not worth the working, but my friend maintained that the gold would grow again in two or three years.

True to his word, in two years he was at the pile again, and by his crude but sure method was saving one dollar per ton from the ore that would yield *nil* by his methods two years before. Again I took samples for assay, and was somewhat surprised to find that the value had increased just 50 per cent, as the result of my determination was 5 pennyweights 16 grains per ton. On investigation I found the sulphurets to be of a character readily decomposed by the elements—in fact to such an extent that, as I afterward calculated, over one-half the pile must have been decomposed or washed away, so that with the decomposition a certain rapid concentration was maintained by the action of heavy rains, and the natural advantage this particular ground offered causing the gold to remain behind while the oxides were carried away in suspension by the water. My explanation has failed to convince my friend of the pick and shovel. As the gold in the tailings has become about exhausted, his last attempt to make it pay was a failure. He remains strong in the conviction that a few years will grow it again.—Science.

Unfreezable Dynamite.

The use of dynamite in cold weather, says E. R. Watman, is attended with some difficulty, owing to the freezing of the material and its consequent liability to fail to explode when the fuse is fired. With proper methods and care the dynamite can be thawed with reasonable safety, but numerous accidents occur (more than get reported in the public press), due to carelessness in the operation and to the treacherous nature of the material, or a combination of both conditions. Dynamite will stand treatment at one time which at another time will result in explosion. An expert on explosives says that the most dangerous means of thawing cartridges are ingeniously devised by ignorant laborers; baking, boiling and toasting being favorite methods, while at a stone quarry, in one instance, an apparatus was arranged for steaming the cartridges over a pot of boiling water. In this latter case the nitro-glycerine leaked through the canvas cover and settled on the bottom of the pot, with the result that an explosion occurred,

the water acting as a tamping to the charge. The fact that small quantities of explosives containing nitro-glycerine will burn quietly and without explosion if ignited by direct contact with a flame has led to the dangerously mistaken reasoning that merely heating the explosive can produce no ill effect. If a dynamite cartridge is ignited or placed in a fire it will probably burn harmlessly away, but if placed on a stove or in an oven and gradually heated to its exploding temperature of 350° to 400° F. a violent explosion is almost certain to result, while before that point is reached the dynamite will become extremely sensitive to shock.

In England alone, from the beginning of 1872 to the beginning of 1890, there were reported 63 accidents due to improper thawing of dynamite, by which 50 lives were lost and 76 persons injured. Reference may here be made to the explosion of dynamite, December 28, 1892, in a thawing apparatus at the works for commencing the Brooklyn end of the proposed New York and Brooklyn tunnel, by which 4 persons were killed and about 20 injured. According to report the thawing was done by placing the cartridges on shelves in a chamber 6 feet square and 8 feet high, heated by a coil of steam pipes.

An unfreezable dynamite, invented by Liebert, a German, has been used to some extent in Europe, and has been favorably reported on by chemists and experts in explosives, and it would appear most advisable to test its practical efficiency in this country. The dynamite is made in the usual way, but its composition includes a chemical by which its freezing point is lowered from 40° above to 50° below 0, F., while the explosive power is slightly increased and the sensitiveness to concussion slightly decreased. This dynamite, it is claimed, is not affected by damp; it may be kept for considerable time without deteriorating or losing its special properties, and its cost is little, if at all, in excess of that of ordinary dynamite. It is patented in the United States.

The Absence of Air from the Moon.

Astronomers have long felt that the absence of air from the moon is a fact that demands some special explanation. Most of the globes in space which are known to us are encompassed by more or less copious atmospheres. Why then is the moon an exception? Why should there be a gaseous investment to the earth and to Venus, to Mars and to Jupiter, and why should the moon alone be devoid of such covering? The sun and other stars are also so very copiously endowed with gaseous surroundings that the total want of anything of the kind from the moon becomes all the more enigmatical.

At last a light has been thrown on the matter, and an explanation is now provided which is so consonant with the present state of physical knowledge, that I cannot hesitate to accept it. The absence of air from the moon is a necessary consequence of the kinetic theory of gases.

According to the principles of this theory, now generally accepted among physicists, any gas such as oxygen or hydrogen is composed of molecules which move with an extreme degree of rapidity. The molecules of hydrogen, for instance, which are the most nimble of all the gases in their movements at ordinary temperatures, dash along so fast as to travel, on the average, somewhat more than 6000 feet a second. Oxygen and nitrogen have movements which are generally much less than those of hydrogen. But it is to be noted that, in the course of their movements, individual molecules frequently attain velocities very much in excess of the average pace. This is the important point for our present purpose, for on it depends the explanation of the phenomenon of which we are in search.

It can be shown that the mass and the dimensions of the moon are such that if a body were projected upward from its surface at a pace, let us say, of half a mile a second, that body would ascend to a very considerable elevation. Ultimately, however, the attraction of the moon would overcome its outward movement, and the body would tumble back again. If, however, the initial pace were so much greater that it attained a certain critical amount of about a mile a second, then the missile, according to the laws of motion, would ascend from the surface of the moon and go on and on never to be again recalled by any power that the moon's attraction could put forth.

Let us suppose that the moon were now to be invested with a new atmosphere of oxygen or nitrogen. The molecules of these gases will, of course, be darting about with the velocities appropriate to their nature; but, generally speaking, the speeds with which they are animated remain within the limits of velocity which it is in the power of

the moon to control. But these are only the average speeds, and it will frequently happen that individual molecules will be animated by a speed equaling or exceeding the critical pace of a mile a second. If this takes place at the upper layers of the moon's atmosphere, the little molecules will take leave of the moon altogether. Other particles follow in the same fashion, and thus it happens that an atmosphere composed of such gases as these we know could not permanently abide on the moon.

On the earth we have and we retain a copious atmosphere. The reason simply is that the earth is massive enough to require that a projectile shall attain a speed of about six miles a second before it goes off and takes leave of our globe. This velocity it would seem that the molecules of oxygen and nitrogen do not generally or ever reach. Hence it is that while the earth can retain the atmosphere with which it was endowed, the moon is unable to do likewise.—Sir Robert Ball in Science.

Mechanical Progress.

Carborundum—A New Abrasive Material.

In a recent lecture of Mr. Nikola Tesla on the production of light by alternating currents of high frequency he referred to the use of a material called carborundum as the light-giving material of an incandescent lamp. The nature of this new material has just been made public by the issuance of a patent, No. 492,767, to Mr. Edward G. Acheson, of Monongahela, Pa., and it appears likely to become of no small importance in the arts.

The new material, says *Engineering News*, appears to be that extremely rare article in these days, a new chemical compound of simple form. It is, as nearly as can be determined, a compound consisting solely of carbon and silicon, one atom of each element to a molecule, so that the chemical symbol of carborundum is Si C.

Physically it is a crystalline substance, very brilliant and usually of a dark color, although the color varies with the materials used in its preparation. The crystals are irregular, resembling bort, and are usually octahedral, although other well-defined forms can be found. Some of the crystals are transparent and colorless. The crystals are extremely hard and highly refractory, withstanding for a long time, at least, the action of the blast from an oxyhydrogen blow-pipe. In fact, the material seems to be intermediate in its physical characteristics between the carbon crystal, the diamond and the silicon-oxide crystal, quartz, resembling the former, however, more than the latter.

It is good evidence of the extreme hardness of carborundum that the first use to which it was applied, and that for which the inventor originally designed it, was the cutting of diamonds. Notwithstanding the old saw of "diamond cut diamond," this material was found to do excellent work on the diamond-cutter's lap, and is the first material other than the diamond itself which has ever been successfully used for this purpose. Prejudice of the workmen, however, as well as the limited possible demand in this industry, led the Carborundum Company, which had undertaken the manufacture of the material, to work up trade in other directions. In June, 1891, the price was considerably reduced and it was brought to the attention of brass and metal workers as a substitute for emery. In June, 1892, further improvements were made in the process of manufacture, increasing the output to 25 pounds per day, and the price was reduced to \$2 to \$4 per pound, according to the quality purchased.

Since that time the material has been extensively applied in the construction of grinding wheels, which are being widely used. The Westinghouse Electric Co. alone uses several thousand wheels per month in grinding in the stoppers of its new lamps. The advantage over emery is in the much greater rapidity of grinding, which overbalances the increased cost of the material.

It may be said that further reductions in the cost of materials may be expected, so far as they will operate to increase the demand for it, as the process of manufacture is simple and the materials are inexpensive. The process in general consists of subjecting a mixture of coke with silica, or silicate of alumina and a flux of common salt, to the action of the heat of an electric furnace. This is accomplished by forming an electric arc in the midst of the mass of material. When the chemical action is completed the products are removed from the furnace and the carborundum is freed from impurities by breaking it into small pieces and washing

and drying. The different-sized crystals are then graded. The company is now building three additional furnaces, which will increase its output to about 500 pounds per day. The applications of the material for cutting and polishing glass, porcelain, steel, cast iron and other hard materials are steadily increasing, and the new discovery promises to be of great and permanent importance in the arts.

A Pound of Coal.

"The day is not far off when we will get heat and power without the intervention and assistance of fire," said Civil Engineer Marston McGrath to a St. Louis *Globe-Democrat* reporter. "The solution will come when we get electricity direct from coal without the loss of any part of the wonderful energy that there is in the fuel. I never knew fully the value of coal as a power-producer until I saw it exemplified on a recent trip across the Atlantic in the steamer *Majestic*. The vessel carried 2400 tons of coal, almost enough to give a half-bushel to every family in St. Louis, and it used up 290 tons a day to maintain a speed of about 23 miles an hour.

"This seems like an awful lot of coal, doesn't it? But the *Majestic* is a big boat, 582 feet long, and it requires an expenditure of 18,000-horse power to drive it at top speed through the water.

"Figure the thing out, though, and you will see that 1½ pounds of coal, which is less than a good handful, furnishes one-horse power for one hour, and one horse power represents the lifting to a height of one foot of 300 pounds, so that your 1½ pounds of coal lift 300 pounds one foot and sustains it for one hour.

"Or take this illustration: It would require 100,000 galley slaves rowing night and day to carry the *Majestic* at a speed of 23 miles an hour. Dividing 18,000-horse power into 100,000 galley slaves, we find that over 1½ pounds of coal represents the work for one hour of about six rowers. Of course there wouldn't be room for the placing of more than 400 oars on the *Majestic*, and 10 bushels of coal would do an equal amount of work, while the 100,000 galley slaves, if they averaged 150 pounds each, would weigh five times as much as the 1740 tons of coal required by the *Majestic* for a six days' trip."

A SUCCESSFUL TEST of a small copper model gun, tempered by the secret process of F. Aillard, of Lewis, Quebec, has, it is reported, been carried out at the Citadel, Quebec. Before firing, the gun was carefully gauged at two different points, one and two inches from the breech end of the powder chamber. In the first experiment, the gun was charged with three-fourths of an ounce of sporting powder, and wadded with a plug of paper driven well home with a mallet. After firing the charge, the gun was examined and gauged at the above-mentioned points; the diameters were unchanged. The next test was a very severe one, 1½ ounces sporting powder being used, leaving only sufficient room for a plug of paper, which, as before, was driven hard home, filling the oierce to the muzzle. This charge was fired with a piece of Bickford's fuse. On examination, after firing, it is stated, the gun showed no flaw or perceptible expansion.

NICKEL STEEL FOR BOILERS.—It has been reported that the Detroit Dry Dock Company of Detroit, Mich., intended to use nickel steel for boilers. The *Railroad Gazette* states that the company has been endeavoring to get information touching on the question of nickel steel and its uses, particularly for boiler purposes. It has canvassed the necessary ground to reach a decision in regard to its use in marine boilers, but thus far has found it very difficult to secure any reliable statistics. It has secured some prices, which have not encouraged it to consider the matter further, as the steel at present is too expensive for such use. The reason for considering the matter was a desire to decrease the weight of boilers, or with the same weight of steel as is now used, to be able to carry higher boiler pressures.

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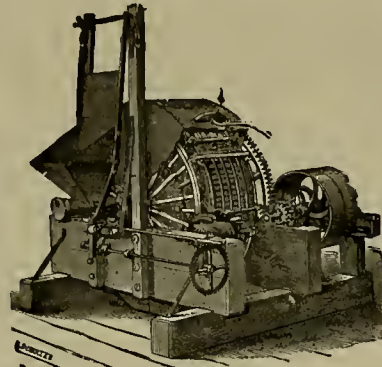
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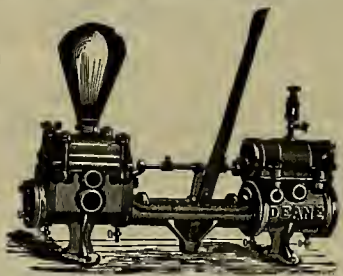
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Useful Information.

Valuable Pacific Coast Shells

Occasionally large and valuable shipments of shells of various descriptions are made from San Francisco to Europe and elsewhere. These comprise rather an important item in our export trade. Formerly abalones received more prominence as an article of export, but they are still in good demand, being used for many purposes, both ornamental and useful. On the California and Mexican coast the *halibuts*, or abalone, shell is much sought for by the Chinese for food and bait. Large quantities of the shells are exported to China and Europe annually for the manufacture of buttons, etc. The pearls found in these shells are light green, and irregular in shape, but the luster is often very beautiful, and they have ranged in price from a few dollars to \$100 dollars each. The most valuable variety known to commerce is the Mexican. It is found clinging to cliffs, reefs and submarine rocks throughout the coast of Mexico from San Tomas, close to the American line, as far south as Acapulco. Blue-green abalones are gathered by Mestizos and brought to Wilmington (San Pedro) by traders and fishermen.

The next most desirable of seashells is the black, of California. By some this is regarded as the richest and most beautiful of all. The wholesale price of this shell has been given as high as \$1000 per ton, and it is used in the same industries as the one heretofore mentioned. The gray is common to the whole coast, and has had a market value of \$700 per ton. It is used for numberless purposes, useful and ornamental. Los Angeles is the center of this trade and Europe is the market, France being the largest buyer. The shells are stored at San Diego, San Pedro, Los Angeles and Santa Barbara, and are shipped as the trade demands. The Chinese, besides providing an unlimited market for abalone meat, which they regard as a luxury, also compete with Europe for the possession of the shells, which are used in China much as they are in Europe.

The abalone-shell trade of California long ago assumed large proportions, the annual value reaching a very respectable figure. In bringing these shells to the perfection of beauty, that determines their value, both the Chinese and European manipulation embraces four processes: First, ground upon a common grindstone; second, applied to an emery wheel; third, polished by hand with pumice stone; fourth, a secret process which gives the final polish.

Mother-of-pearl are the most valuable of all shells, and are known to the trade as the "Tahiti Shell." They are deep-water shells and are found around and off the coast of the island of Tahiti. Native divers raise them to the surface and they are brought to California by traders who procure them in barter. The Tahiti shells are marketed solely as articles of vertu, bric-a-brac and curios. In Europe they find additional use and value in the manufacture of rare and elegant articles of fancy, fashion, toilet and jewelry, and in the creation of costly and artistic island work.

Pearl oyster shells are found along the Mexican coast, and at La Paz their gathering and shipment forms quite an industry. They are used in the manufacture of pearl buttons, and the trade is confined almost exclusively to France.

The Redwood's Disappearing.

The question as to whether a redwood forest that is once cut away will renew itself is one that has occasioned much discussion among lumbermen. So far, however, as the evidence supplied by the abandoned logging woods of this county is concerned, the question must be answered in the negative. There are, adjacent to Eureka, tracts that were "logged off" more than 30 years ago, yet there is little or no new growth of timber upon them.

When redwood trees are cut, sprouts sometimes spring out from the stump and grow quite rapidly for a time, but that these sprouts seldom or never develop into large trees can be seen by examining almost any old logging claim.

Another noticeable feature about our redwoods is that groves of young trees are seldom found, and then only on the outer borders of the forest. Back in the primeval forests a young tree is seldom seen. One explanation of this is found in the fact that the redwood seldom or never propagates itself by means of its cones, as do pines, spruce, hemlock, etc. Practically speaking, all the young trees are sprouts.

Several years ago the writer, accompanied by Hubert Vischer, an agent of the State Forestry Commission, spent several days in

investigating this question of the reproduction of the redwoods, and the conclusion reached was that, practically speaking, the forests will never be reproduced. This conclusion is also in accordance with the theory of Professor Kellogg, the botanist, that our redwood forests are the remnants of a former epoch, and are the results of geological and climatic conditions that have long since passed away. If this theory be true, in another generation all that will be left to indicate the grandeur of the departed redwoods will be an occasional blackened and decaying stump, unless some provision be made to soon preserve as a park some portion of the primitive forest as a heritage to future generations.—Humboldt Times.

The Farrier's Art.

Points to be observed in shoeing a horse properly:

Twist off the old clenches, or rasp them off without touching the crust.

Gently raise the shoe in such a manner that the crust shall not be broken or spoiled.

Don't use a knife, but with a rasp make the sole quite level.

The toe must be rasped down more than at the heels, and the more you can rasp away the soles at the toes without making the sole convex, the shorter the toes will look, and bear in mind that this is the only way that the toe must be shortened.

Endeavor to keep the frog so high above the heels that when the shoe is on, it shall be about one-sixteenth of an inch above the level of the shoe.

With the rasp held at an angle, gently rasp around the edge of the crust to take off the broken edges before the shoe is applied.

The sole of the foot being a dead level and flat, and the foot side of the shoe a dead level and flat, there will be no occasion to burn the foot to make a fit.

Be careful that the shoe fits the foot all around the heels, and that the hoof does not project beyond the hoof.

In like manner the shoe must not project beyond the hoof.

See that the nails fit the holes tight.

In order that the foot may expand when placed on the ground, don't use nails far back on the inside.

Let the nail's point come out in a level line all around the foot about three-quarters of an inch above the foot side of the shoe.

The shoe having been nailed on, twist off the projecting points of the nails and turn down and hammer down the stumps to form clenches.

The rasp must not touch the foot after the shoe is on.—London Live Stock Journal.

AMERICAN SAILS.—It will be gratifying news to all Americans to learn that the British are beginning to recognize the knowing cut of American sails. Last season the two little Yankee fin keels exported from the Herreshoff yard at Bristol, R. I., had things their own way in British waters. For the first time in history, a full suit of sails for a racing 40-rater is to be sent to Great Britain. John M. Sawyer & Son, of South street, who for years have been making sails for all the crack American craft, have received the order from George L. Watson, the designer of Lord Dunraven's Valkyrie and the Prince of Wales' Britannia, to make a suit of racing sails for a boat now on the stocks. It is really an encouraging sign to see our British cousins go in for a suit of American cotton duck, in place of Scotch jute. The British "spinnaker silk," so called, perhaps, because there was not one atom of the product of the silk worm in its composition, has gone out of fashion in these waters. The climate is too trying. It can't stand our air. It has a tendency to split and blow out of the holt ropes in the slightest squall. In its stead has come into fashion a pure product of the American mills, fine as satin, strong as steel, and thus again Britain bows down to Yankee ingenuity.—N. Y. Recorder.

THE beautiful sheet of artificial ice, on which so many Parisians have skated during the present season, is the result of a careful working out of a system that proved unsuccessful some three years ago. The machinery consists of two ammonia ice machines, driven by two 50-horse power steam engines. The ice machine has pumps which force ammoniacal gas into water-cooled condensers, liquefying the gas, which then passes into large reservoirs, where it expands with the production of cold. The same gas is pumped back and used continuously. The rink is about 60 by 130 feet in size, with a floor of cork and cement, upon which is laid three miles of connected iron pipe. Through this pipe circulates a solution of chloride of calcium, an uncongealable liquid, which, by passage through

spirals in the refrigerating reservoirs, is cooled to 5 to 20 degrees below zero, according to necessity. The water over the pipe is thus kept frozen, and daily sweeping and flooding preserves the smoothness of the ice.

Electricity.

Concentric Wiring and Safety Wiring.

In the very first systems of distribution of the electric light in multiple arc, which we believe was that proposed by De Khotinsky, it was suggested to use the earth as the return circuit, but when electric lighting became a commercial industry this was abandoned and all circuits were very carefully insulated from the earth. Gradually, however, it was found that certain indisputable advantages existed in grounding the neutral wire of a three-wire system; and now the other extreme is reached by the advocates of what is called concentric wiring, who claim that great advantages, besides much greater safety arise in grounding one wire of any system, be it three-wire or two-wire. Thus, after a complete cycle, we are led back to the very first method. This system, to which a reference will be found in our digest this week, consists essentially of two conductors, one outside of the other, enveloping it completely, the outer one being grounded as thoroughly as possible; all switches, cut-outs, etc., are made of metal instead of porcelain, and are grounded. The claims made for it are not unreasonable, and it seems to us that such a system is well worth more careful consideration, notwithstanding the prejudices against it. It should not be forgotten, however, that, unless a system is grounded thoroughly at both ends and at as many points as possible, leakage currents may arise due to a difference of potential of a few volts between different parts of the wire and the earth, such currents being sufficient to do considerable mischief in corroding the wires. In a system in which such earthed currents are used, as in lighting or railway work, if grounded at all, the wires should be very thoroughly grounded not only at the two ends of that wire, but also at intermediate points; such grounds, furthermore, should be soldered contacts, as one should not trust to mere contact produced by pressure.

In connection with the system of concentric wiring, just referred to, we may be pardoned if we call attention once more to a fact which is not understood and appreciated as much as it ought to be, especially by insurance companies, who are our dictators and rulers in regard to wiring. Some of their rules say that the two wires must be kept a certain distance apart; as a matter of fact, however, it can readily be shown that the closer they are together the safer they are. This may readily be shown by nailing two bare wires on a board and moistening the wood between them; when they are two or three inches apart the leakage current will slowly set the wood on fire, and as this requires a very small current the fire may be started without blowing the safety fuse. If, on the other hand, they are close together, separated only by a thin layer of insulating material capable of absorbing moisture, the current will become so great that the fuse will be blown immediately, before any charring or ignition can take place. The experiment is such a simple one that those who do not believe this statement can readily satisfy themselves by making an actual test. In making this test it is advisable to put some salt or soda into the water. Contrary to general belief, it therefore appears to be much safer to place the wires as close together as possible, provided proper precautions are taken to prevent the accompanying flash from igniting any very inflammable material.—Electrical Review.

Electric Lamps in Omnibuses.

Some time ago, the London General Omnibus Company decided to try the experiment of introducing electric lamps into the leading routes of omnibuses owned by them, and, after negotiations, entered into an arrangement with the Bristol Electric Safety Lamp Works to supply 140 omnibuses with small incandescent lamps worked by their patent battery, according to the London *Electrician*.

The battery selected for this service weighs about eight pounds, and is placed in a wooden box under one of the seats. The box is provided with two brass spring terminals, which make automatic contact with the battery when it is let down into the box. The lamp is of a special design, and is made as shallow as possible, to allow of its being placed in the center of the roof, it being found that this arrangement distributes the light most satisfactorily all over the car-

riage. The lamp is covered by Mr. L. Bristol's patents, and offers great advantages for omnibus work, since breaking of filaments from the shaking of the carriages is avoided. Ordinary bottom loop lamps are used, and two wire hooks, which expand sideways, clasp these loops firmly. A wire spring, which catches the top of the incandescent lamp, forces it against the wire hooks and increases the clutch of the hooks.

The batteries are charged at Victoria, seven in series, from the Westminster Electric Supply Corporation's mains, small incandescent lamps being used as resistances. The batteries have, we understand, stood the test in a very satisfactory way, and the severe shaking to which they are necessarily subjected while in use has had no effect upon the plates.

The installation has been very successful, the only difficulty experienced being to get time to charge the batteries for the whole night's run, as the lamps are delivered between the hours of 9 and 12 A. M., and the serving out commences about half-past two, but a sufficient number of spare batteries now provided will overcome this difficulty.

A type of lamp and battery which is used by the ticket inspectors in the employ of the London General Omnibus Company consists of a pocket accumulator and a button-hole lamp.

Engraving by Electricity.

A discovery is announced which, if practicable, may possibly entirely revolutionize engraving by the ordinary present-day system, and particularly those of photographic processes, says *Invention*. The subject is drawn on a plate of zinc, which is covered by a layer of bitumen either by the artist or by photographic means; then it is plunged into a bath of diluted acid, when it is put into communication with a battery, one pole of which is simply placed in the acid. When the current has been set to work the acid attacks the metal very quickly, a few minutes sufficing to obtain the required depth, as it is very easy to control the current. This process is the more preferable to the present methods, as the regulation of the engraving to an exact mathematical depth is easily obtained, whereas in the method of engraving by acid baths the surface of the plate is covered with a pellicle of hydrogen, under which small air bubbles continually appear, necessitating the constant moving about of the bath and a constant brushing of the plate.

The discoverer believes that the action is due to a polarization on the surface of the metal. As we take it, the current of electricity is utilized for the production of plates, not by acting directly upon the plate itself but in the proper regulation of the current so as to give more or less action direct to the acid. It is noted in this process that if a plate of metal is plunged into a bath of acid and put into contact with one pole of the battery there are no bubbles to be seen on the parts of the metal in contact with the acid, and the etching is made much more regularly and quickly than under ordinary conditions. The obviating of these air bubbles on the surface of the metal is a very important point, because their presence results in unequal biting of the surface of the plate, both laterally and vertically, and outlines lose their effect by the clearness of the design being interfered with. It is this which causes the necessity for the use of the rocking vessel and the constant use of the brush in the ordinary methods.

A CLEVER CONTRIVANCE has been invented for the detection of small pieces of magnetizable metal, such as needles, tacks, steel and iron chips, etc., that may have entered the human body unawares and hidden themselves in the skin or deeper tissues. The instrument was devised by Dr. J. B. Williams, formerly of San Francisco, and consists essentially of a partially astatic combination of small magnetic needles suspended within a glass tube, the tube being covered with unfoil to minimize electric action, except for a small space through which the needle can be observed. It is claimed that the instrument is sufficiently delicate to detect the presence of one-eighth of an inch of steel or iron wire at a distance of six inches from itself. Such an instrument will be of the greatest service in many cases where the ordinary methods of detecting the presence of foreign metallic substances are ineffective and unreliable.

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Machinists in the Navy.

The United States Navy is finding trouble in obtaining men of the desired quality as machinists. It has been repeatedly pointed out, says *Iron Age*, that this failure does not result from any reluctance to comply with the conditions generally imposed by a military service—cleanliness, discipline and the privilege of going on shore. We think the true reason may be found in the fact that there is inborn in the American mechanic a strong ambition to advance himself. He is willing to begin at the lowest round of the ladder, provided he is assured there is a chance of rising. He is willing, and in fact prefers, to work with the understanding that promotion depends solely upon his ability and attention to business. Further than this, the ambition of the American mechanic, in nine cases out of ten, is never satisfied, because, no matter to which rung he may ascend, he always sees something higher to strive for. These aspirations are killed the instant he enters the navy, and, to express it in a left-handed way, he therefore stays out. He knows that the position of chief engineer will never be within his grasp, no matter how well qualified he may prove himself to be, and that even an assistant position with any responsibility will not be offered him. As far as advancement is concerned he does not enter the navy through the proper channel—he has not the requisite technical education and has not been through a school of marine designing.

We should rather place "the costly machinery of a modern war vessel" in the hands of a man who had long practical experience in the shop and in the care of machinery of a like character, than in the hands of the designer of that machinery who had had no practical experience. When everything is running smoothly the special qualifications of the chief engineer are of minor importance, but it is in the time of emergency, such as an accident to some part, that his skill and training as a mechanic are brought into play, and it is at this stage that wide, practical experience proves superiority.

The advantages to be derived from the system of recruiting from the ranks are recognized in foreign navies and in the merchant marine of every country. Had it not been customary and possible for a man to enter the service at a low rank and finally rise to the highest, Chief Engineer Tomlinson would not have been in charge of the Cunard steamship "Umbria" when her shaft was recently broken in mid-ocean. This was a case of gradual promotion due to merit. It is not too much to assume that had Mr. Tomlinson known that a post of responsibility was beyond his reach he would not have entered the marine service. In the German navy the designing engineers serve on shore, and the engines are in charge of men recruited from the chief machinists. It will be seen that the machinist may rise to the grade of engineer-in-chief. Practically the same regulations govern advancement in the Austrian and Italian navies, and in the latter the mechanic may rise to the grade of a commissioned officer. In these countries the machinery is not in charge of scientifically educated engineers, but of men of practical experience brought, we might say, from the shop. More particularly in Germany, Austria and Italy, there are two distinct classes which in no way conflict with one another—the designer who has nothing to do with the machine he creates, and the engineer who takes the machine as built and runs it to the best of his ability. Promotion follows the law of survival of the fittest and the path to the highest position is open to all.

One benefit that would result from increasing the prize to be sought by the machinist in the United States Navy would be the introduction of men of superior qualifications at the start. Having an incentive beyond their immediate pay to work for, better men would enter the service. Instituting a competition of this character would end in placing the best men in responsible charge, since only those of superior ability could rise.

Silvering Glass.

The following method of silvering glass is, according to an exchange, said to be eminently successful, and is largely adopted in many manufactories: There are two solutions used in the process, known respectively as the reducing and silvering solutions. To prepare the first, dissolve 12 grains of Rochelle salts in 12 ounces of water, and boil; then add, while boiling, 16 grains of nitrate of silver dissolved in an ounce of water, and continue the boiling for ten minutes, after which add sufficient to make 12 ounces. To prepare the second, dissolve

one ounce of nitrate of silver in ten ounces of water; then add liquid ammonia until the brown precipitate is nearly, but not quite all dissolved; then add one ounce of alcohol and sufficient water to make 12 ounces. Distilled water should be used in making these solutions. When both preparations are ready, take equal parts of both solutions and mix them thoroughly; then lay the glass face down on the top of the mixture while still wet, the glass being carefully cleaned with soda and well rinsed with clean water. About two drachms of each solution will be sufficient to silver a plate two inches square. The dish in which the silvering is done should be a little larger than the plate. It is better to let the solution stand and settle two or three days before being used.

The English Language.

Professor Vamhery has been lecturing on the "Fashions of Language" before the Buda-Pesth English Club. English, he said, may now be called the most fashionable language in all the five parts of the world. It began to spread in the first decades of the century through English literature, and in Asia by means of accelerated communication. Steamers were the wings of the English language in the far East, and its spreading from India and the Straits settlements to China and Japan is simply miraculous.

There is no exaggeration in saying that the number of English-speaking Asiatics amount to-day to 3,000,000; that of Europeans to more than 1,000,000, and these, added to the 126,000,000 Anglo-Saxons, give a total of English-speaking men and women of 130,000,000. Should the increase continue in the same proportion, the middle of next century will have 200,000,000 English-speaking persons and the English will have no rival in the world beside the Chinese.

Phonetically English is unsuitable for the foreigner, and the lecturer declares he always suffered acute pain in the jaws when speaking publicly in England and trying to imitate genuine English. The phonetic difficulties are, however, amply rewarded through the expressiveness, the rare precision, vigor and exactness in which English surpasses all other European tongues. London News.

ELECTRO-METALLURGICAL PROCESS.—Some particulars of the electro-metallurgical process which, according to the German experts who have tested the method, is to revolutionize the metal industry have reached us, says *Invention*. Not only iron, but also other metals, such as gold, silver, copper and aluminum, can, it is said, be extracted from their ores by this new and infinitely cheaper method. When it is considered that the current generated by a dynamo driven by a small gas or petroleum engine will be capable of extracting day for day more metal than the largest blast furnace is able to produce, some idea may be formed of the radical changes which are likely to be the result of the employment of the new process. The inventor has, it is reported, succeeded in devising a practical process which has secured the ready support of a number of well-known American and German capitalists, who propose forming a gigantic international syndicate. The statement as to the saving of 80 per cent on the present blast-furnace method is said to be no exaggeration.

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Any stock upon which this assessment shall remain unpaid on the 24th day of March, 1893, will be delinquent, and advertised for sale at public auction, and, unless payment is made before, will be sold on Wednesday, the 5th day of April, 1893, at 1 o'clock P. M., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
I. N. WITHERS, Secretary pro tem.
Office, Room 2, No. 323 Front St., San Francisco, Cal.

POSTPONEMENT.

At a meeting of the Board of Directors of the Superior Mill and Mining Company held on the 28th day of February, 1893, the day of delinquency in the above assessment was postponed to April 3d, 1893, and the day of sale to MONDAY, April 24th, 1893, at the same hour and place.

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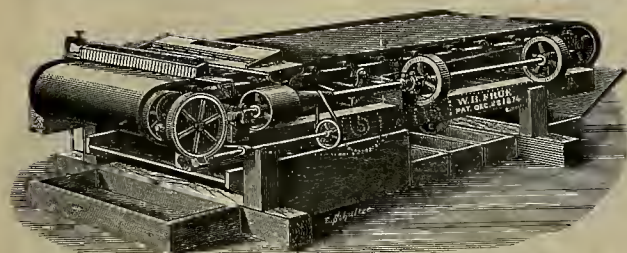
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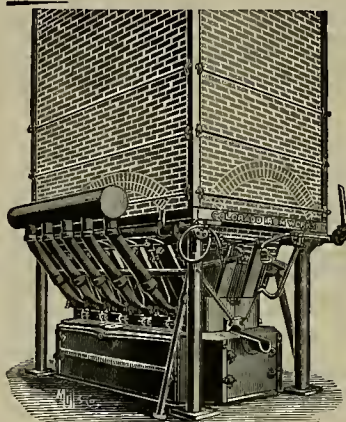
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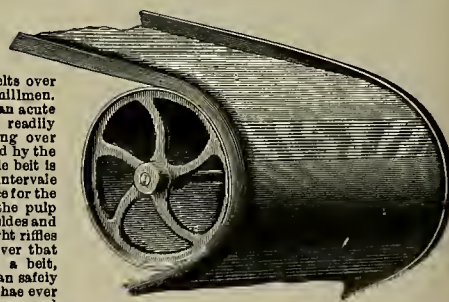
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We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen. First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers, thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevent it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrating belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.



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BUCYRUS, OHIO, U. S. A.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KEYSTONE.—*Ledger*, March 31: The Keystone mine, at Amador City, is to be lighted by electricity. The plant will be an extensive one. Surveying has been done preliminary to putting in the plant. The New London, Plymouth district, the property of Wm. Hynds & Co., has been bonded to Eastern capitalists for five months. The new company intends to go to work on the property in a short time, erecting machinery and developing the mine. Nothing definite can be learned as to when the Zelle mine will resume operations. It will be several weeks yet, however, as there is considerable repairing to do. Our people will naturally rejoice when work begins at the mine, as it will add a monthly revenue of \$3000 to \$3000 to the town. As we have before noted in this column of the *Ledger*, the Bunker Hill is about to be opened by a company of gentlemen from the East. They have secured a working bond on the property and their manager is now on the coast looking after their interests. Certain work has to be done within a certain specified time, and they will have to get to work immediately in order to save their bond. The manager says they will get to work in a few weeks. The Bay State Mining Company has had a hard contest with the water during the last six months. Some time ago it contracted with Knight & Co., for a pump, which was put in operation about a month ago. For some time the working of the machinery was not what it should have been, but the contractors made some changes which have produced desired results, and now the Bay State's pump comes up to the requirements of the contract. Knight & Co. have put in another pump temporarily to lower the water, and when it is down the company's pump will be able to keep the mine clear. It is confidently expected by those most interested that in a short time they will be able to resume work in the mine.

VOLCANO.—*Amador Record*, March 30: Some damage has been done here by the late storm. The Volcano Company's hydraulic equipment has had a great influx of debris from above. Sutter creek, with an unprecedented volume of water, brought down an immense quantity of old tailings, which will set back their pay-dirt washing some weeks. Mr. Peck, who owns some good tailings north of the town, had them washed down to his flume in such a quantity that the flume choked up and he could not manage the wash. He is philosophical, however, and worries not. He has quite an extent of ground running up through the town. The Fort Ann and Robinson mine, Mr. Norton superintendent, has been compelled to suspend operations for awhile. There is more water than the pump can handle. At the Mexican mine, after running a long tunnel, Supt. Beardsly has encountered gravel. We did not learn what it prospects. Mr. Byrd is elated over a rich find made on his place three miles west from here. It seems that years ago a man named Eastman and others sank a shaft 50 feet deep in the meadow. Owing to death the work was abandoned. Lately Mr. Byrd took a pan of the dirt from near the shaft, and to his surprise and pleasure obtained \$1 therefrom.

Butte.

BOOMING MINAS.—*Oroville Mercury*, March 30: It is very encouraging to note the increased interest in mining affairs in Eastern Butte. Hardly a train arrives in Oroville but what hears capitalists and prospectors on their way to the quartz mines in this section. This revival extends from the Oregon City mines, near Oroville, eastward to the Hurleton and Forbestown districts and northeasterly to the Merriam and Lumpkin ranges. The most pronounced boom is at Forbestown, where two very large properties are being operated. Fifty stamps and immense reduction works, the largest in the northern part of the State, are running night and day, and the works are to be added to extensively. These works employ big crews of men at good wages, and capitalists are preparing to open other mines. Buildings are going up on every hand and the town is said to rival its old-time prosperity when a thousand men dug gold from the surrounding hills. At Hurleton, too, there are extensive developments going on and several large mines are being systematically opened. Oregon City has its boom, and in every section of Eastern Butte prospectors and capitalists are looking for ledges. The best of all this activity is that it promises to be permanent. The old primitive slip-shot methods of working quartz have been abandoned and latter-day systems and methods have been inaugurated. The quartz mines of Butte never paid in early days because they were not properly handled. They are yielding rich returns now because their owners are using science, common sense and economy in their working. It costs money to open quartz mines, and the rich ones at Forbestown were developed at a cost of several hundred thousand dollars before they began to yield returns. That it was money well spent the present status of affairs indicates. The Stow mine is said to be yielding at the present time \$15,000 a month above all expenses, and the ledge is so extensive that enough ore is in sight to operate the present mill 30 years without running new levels. From present indications we are safe in saying that the next two years will witness an influx of people into eastern Butte unparalleled in its history.

Calaveras.

MUAPHYS.—*Calaveras Citizen*, March 30: A large force of miners has been put on duty at

the Beatrice mine here, and it is presumed work will be urgently prosecuted during the coming months. One of the greatest deterrents to the development of mines in this vicinity is the fact that nearly every piece of land for miles has been subject to agricultural locations which debar all legitimate following of quartz prospecting or mine opening. J. S. Sublet brought in some good ore from the "Chimney Rock" mine located by him beyond the Stanislaus river. He affirms that, in addition to the quartz mine found by him, there is a deposit of gold-bearing placer within the boundaries of the "Chimney Rock" location. I paid a visit to-day to the long tunnel of McCormick, Bisbee & Thomas, at Douglas Flat. The courtesy of a visit was extended by Mr. Thomas, one of the owners, and he gave a detailed illustration of the working of the tunnel and its purposes. The tunnel is now in a distance of 1300 feet and is straight as an arrow. A number of strata has been passed through. Cobble, lava, granite, hard, blue slate and conglomerate are among the varied formations. Two shifts are working—the night and day shifts. Both shifts are composed of men of years of experience, as the splendid workmanship of the tunnel will show. Hand-drills are used and both single and double drilling is carried on as the positions warrant. It is thought there will be about 4000 feet more to be run to tap their main channel on Central hill, though the gravel channel may be encountered at any time now. Two air shafts have been sunk at sections to furnish air for the workmen and of which there is now a good supply, easily expelling the smoke after blasting. The owners are sanguine of opening up one of the best mines in the county at an early date, and they have basis for their expectations, as no mine could pay better than did the Central Hill mine at its past working. The owners are all old-time residents of Calaveras county and are pushing the enterprise for all the mine is worth, and with no view to eventual speculation.

El Dorado.

BEAR CREEK.—*Georgetown Gazette*, March 30: Demuth Bros. have suspended operations on their mine at headwaters of Polecat gulch, but will resume shortly with hydraulic pressure. Bear creek was much higher during the last freshet than ever before in the memory of the oldest inhabitants. The outlook for mines and miners was never so promising as at present. The seam diggings of H. A. Wagner are netting their owner handsome dividends, yielding as high as \$10 and \$12 to the pan. This is a valuable property, and will no doubt be operated on an extensive scale by San Francisco parties during the coming summer. The gold is exceedingly fine, but if it could all be saved by improved machinery, it would undoubtedly prove to be fabulously rich.

Mono.

STRIKE AT BENTON.—*Inyo Register*, March 30: J. O. Wheeler has made a strike about nine miles southwest of Benton, in the Clover Patch district. The ore is free-milling gold, running from \$25 to \$50 a ton. It is thought that Mr. Wheeler has found a proposition that will recompense him for his long work at Benton. Some of our exchanges report concerning the strike that it gives nine-thousand-dollar assays, etc., but the above facts are obtained from direct authority.

Nevada.

THE GREEN MOUNTAIN MINE.—*Grass Valley Union*, March 31: Most of the machinery has already been moved from the old Green Mountain shaft to the new, and two more weeks of good weather will see the work completed. The new shaft is going down very rapidly, but at present the miners are bothered somewhat with water.

OSBOEN HILL MINE.—*Grass Valley Union*, April 1: Work is being pushed rapidly forward at the Osborn Hill mine, of which Mr. Goldstone is superintendent. Workmen are busy cleaning out the shaft, and the work is nearly completed. The new building and machinery will be placed in position the coming week. A very fine looking piece of rock was taken out with the debris yesterday. It had been detached from the ledge by a cave in the shaft. The rock showed gold very nicely and was filled with mineral.

THE SPANCEVILLE COPPER MINE.—*Spenceville*, the location of the Imperial Point and Copper Co.'s mines and plant, now under the able superintendency of Mr. Otto Woehler, is presenting an appearance of great activity. Copper cement is being constantly shipped to the railroad and vast improvements are contemplated in the plant works. The old furnace is being demolished and a new one will be constructed which will be the finest of its kind on the coast. An increased number of men will be employed in the near future, and the prospects are that this little community will soon become a thriving town.

QUARTZ.—*Placer Herald*, March 30: A few of the railroad boys, who are known on this division, are opening up a quartz mine across the river in Nevada county, about 12 miles from Auburn, which, it is said, promises to prove a fine property. They have a well-defined three-foot ledge which is prospected to a depth of over 150 feet, and shows good milling ore from top to bottom. Some tests made in an arrastre yielded about \$15 a ton. They have a mill erected at the mine which they are preparing to run by steam-power, an engine having been recently purchased at Grass Valley for that purpose. Among the owners are Lew Pierson, Geo. Moffett and Thos. Rudick, all prominent and popular railroad boys.

Placer.

BORING FOR GRAVEL.—*Placer Herald*, March 30: The boring machine for prospecting gravel mines, referred to in a late issue of the *Herald*,

has been set up and is being operated on the Forest Hill divide. The Drummond quartz mine, between fowa Hill and Forest Hill, the property of Hon. C. F. Reed, has developed a very rich lead lately, and report says it is now turning out some as fine rock as ever came from a quartz mine in the county.

ANOTHER STRIKE.—A. O. Bell, who made the big strike some years ago on Bald Hill and took out a good many thousand dollars in a comparatively short time, has made another strike which, from all accounts, is as rich as the former one. The strike was made this time on the old Brokaw place, on the Clipper Gap road, between four and five miles above Auburn. He struck rock carrying free gold, we understand, within a few inches of the surface, and in one day took out about \$1000. It is said the lead is well defined, and, at last accounts, its richness was holding out. Bell is a persistent prospector, has unlimited faith in the richness of this region, and in his day has made more lucky finds than any other prospector in the county. He is a big-hearted fellow and when he has money he spends it with a lavish hand, and, consequently, everybody rejoices to hear of his good fortune.

San Diego.

STROCK IT RICH.—*Los Angeles Times*, April 1: A few days ago A. G. Hanson, an old miner, J. G. Austin and A. H. Colby, a well-known breeder of Shorthorn cattle from Nebraska, who is down here for his health, made a strike of an unusually sensational nature while prospecting in the mountains about 30 miles northwest of Julian, in San Diego county. In an interview with a *Times* reporter yesterday, Mr. Colby stated that he and his companions found a big rock of peculiar formation, which was entirely foreign to its surroundings, some four miles below the gulch in which they finally located. This rock, upon being broken up, proved to be rich in gold, and upon this clew the trio started out in their search for wealth. For several days no trace of the rock for which they were hunting could be found; but finally, while walking up a narrow gulch, they saw a ledge of it cropping out of the side of the mountain some distance above them. Upon climbing up to investigate, they found, to their surprise, that the ledge, which was at least 50 feet in width, and cropped out for 40 or 50 yards, fairly glistened with gold, and monoments were at once erected and claims staked out by the jubilant prospectors. A small flask was produced by Mr. Colby containing a sample of the pounded ore taken from the Good Luck mine, as it has appropriately been named, which fairly teemed with the precious metal. The news of this lucky find soon spread, and a large number of miners are already in camp in the vicinity.

Siskiyou.

PLACERS.—*Yreka Journal*, March 29: The Spangler Bros. are making preparations for big work in their extensive placer mine at the mouth of Humboldt creek this season. They will open up the claim from Klamath river, along the creek bed, having just secured a fine double-action or double-cylinder 15-horse power steam engine to hoist the pay gravel into the sluices and also hoist or haul out of the way the immense boulders at the mouth of the creek. They will also drain the claim with a large pump run by an overshot wheel in the creek, using both creek and seepage water for sluices. In case the creek gets too low to run the wheel in midsummer, a wheel will be placed in Klamath river or else the work may be continued day and night by steam-power. The pump must be kept working all the time, hence the necessity of a water-wheel for the pump when the claim is only worked during the daytime. An exceedingly rich find of cinnabar has been discovered lately by H. J. Barton and P. C. Lange on Klamath river, opposite the mouth of Horse creek, below Oak Bar, the claim being known as the Molly O'Leary mine. From prospects so far realized, this mine is destined to prove one of the richest cinnabar lodes in the State, and is also believed to be very extensive. Archie Nichols has been taking out some very rich specimen quartz lately from his ledge on the north fork of Greenhorn, and should he find the ledge permanent, it will be a fortune. C. A. Bsgart & Co. have been ground-sluicing steadily for some time past at their placer claim on Dutch creek, Klamath river, and expect to realize a handsome yield. They intend to keep on sluicing until the water supply gets low before making a cleanup. Austin & Co., of the Greenhorn blue gravel mine, have finally succeeded in fishing up their big pump after considerable hard work in pumping out sufficiently with a number of small pumps. Their big steam pump is now fixed up in first-class order, which will keep the claim drained for good work as soon as the water is all pumped out. The shaft is over 100 feet deep, which, with the drifts, contains a great amount of water, and a heavier flow is coming in at the present time than at any other period of the year, but not more than the pump can handle easily. A. Kaiser and H. Nicholas have taken out about 25 tons of good-looking quartz from the Clark & Wheeler ledge on Humboldt, and will continue getting out more so as to have a good supply for crushing by the time the snow melts off the road for hauling to mill at the forks.

Trinity.

THE HOBBAEN MINE.—*Trinity Journal*, April 1: Last summer a party of Colorado capitalists purchased the Hubbard mine and water-right and the water-right of the John Smith estate and incorporated under the title of the "Trinity River Hydraulic Gold Mining Company." A ditch 12½ miles in length was constructed from Redding's creek to the mine capable of carrying 600 inches of water and at an elevation sufficient to give a pressure of 176 feet at the present opening of the ground. The ditch was surveyed by, and constructed under the direc-

tion of, W. S. Lowden, and the work is well done; and, barring the sides and caves which all newly constructed ditches are subject to, it stands the storms very well. The mine was opened at one of its lowest points and the flume given a good grade, and the amount of auriferous gravel handled by the quantity of water above mentioned would astonish a novice at the business. The water is reservoired and a five-inch nozzle is used on the giant, the stream playing on the bank about 10 hours out of the 24. Two undercurrents are used to catch the fine gold and such other gold and amalgam as escapes from the two main flumes. Last

Wednesday we had the pleasure of visiting the mine in company with L. L. Bailey. On arriving there we found the mine running under economical management, J. R. Flagg superintending, and a quantity of gold that would make a poor man's eyes water was visible in the bedrock ditch and flumes when the water was turned off. Probably there is not a mine in the State that can show more gold for the amount of water run than the Hubbard. A run of 42 hours gave the company a cleanup of 80 ounces from one flume alone, and it is estimated that as much more was deposited in the other flume and undercurrents. The water has been in the ditch constantly since the 17th of March without a break, which is pretty good evidence of the substantial manner in which the work has been done. Wm. Gelder, of Gelder, Bailey & Co., mining brokers of Denver, is president of the company and A. G. Dunbar, who is quite well known here now, is vice-president and general manager—both experienced mining men and noted for their integrity and fair dealing. Mr. Bailey, of the above-named firm of mining brokers, is a young man of sufficient energy and push to make a success of any enterprise he undertakes, and his shrewd judgment makes him a safe man to follow. Just before going to press, we are informed that arrangements have been consummated by which the property of the Trinity Gold Mining Company (Ward mine) is about to change hands. Some of the same parties who are interested in the Hubbard mine are taking hold of the Ward mine, and when water is brought to this ground as contemplated, it will be one of the most gigantic mining propositions in the State. The ground is very rich and the acreage large, and the only thing that has kept this property from producing more bullion than any other on the Pacific Coast was lack of wealth on the part of the owners to bring in sufficient water.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, Apr. 1: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stopes, from the 10th to the 15th floors above the sill floor of this level. 1600 level—Are extracting a few tons of ore from the old stopes east of the main south drift. 1650 level—We continue to extract some ore from the old stopes, eight floors up in the upraise No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. From these north workings, 27 feet up, a west drift has been advanced 23 feet; total length 53 feet; continuing in a porphyry and quartz formation carrying a low assay value. From this west drift, at a point 50 feet in, an upraise has been started. Have extracted during the week from all parts of the mine 649 cars of ore about 640 tons. Shipped to Morgan mill 625 230-2000 tons of ore. Average assay value, per railroad car samples, \$35.71. The average assay value, per battery samples, of all the ore worked at that mill during the week (905 tons) was \$32.52 per ton. Bullion shipped to the Carson Mint, assay value, \$13,023.87. Bullion now on hand in our assay office, value about \$13,000.

OPHIE.—1555 level—The winze now going down below the sill floor of this level has been sunk during the week 15 feet; total depth, 30 feet. The bottom is in porphyry and streaks of low assay value.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 20 feet; total length, 89 feet, continuing in a soft porphyry formation carrying clay separations and showing fine lines of quartz.

UTAH.—340 level—The south drift from the main west drift at a point 595 feet in from the shaft has been extended 24 feet; total length, 229 feet; continuing in porphyry, clay and quartz formation.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 13 feet, making the total length 250 feet; the formation in the face is porphyry and clay and stringers of low-grade quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 21 feet, making the total distance west of the joint shaft 3057 feet; this face is in hard porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 21 feet, making the total distance west of the joint shaft 3057 feet; this face in hard porphyry.

ANNES.—North drift from east crosscut No. 1 north on 420 level advanced 15 feet; total length, 187 feet; formation, clay and quartz.

GOOLN & CORRY.—Sutro tunnel level—The joint east crosscut with Best & Belcher Company has been extended 19 feet; total length, 134 feet; face in porphyry. From the end of this crosscut we have started a west crosscut and advanced same 7 feet, passing through porphyry.

BARR & BELCHER.—Sutro tunnel level—The joint east crosscut with Gould & Curry Company has been advanced 19 feet during the

week, passing through porphyry; total length, 134 feet. From the end of this crosscut we have started a west crosscut and advanced same 7 feet; face in porphyry.

HALE & NORCROSS.—Main Shaft.—Have finished putting in guides in the north hoisting compartment. Main Incline.—We continue making the necessary repairs. 1800 level.—Advanced west crosscut on our south boundary 21 feet; total length, 53 feet; face in porphyry and quartz.

CHOLLAR.—Are repairing the west crosscut, 450 level, and retimbering the two north compartments of the main shaft above 930 level. The east crosscut near the south line, 930 level, is out 85 feet; face in clay and porphyry.

POTOSI.—East crosscut No. 3, 850 level, is out 329 feet; face in hard porphyry. The north drift from the east crosscut opposite the Potosi winze, 930 level, is out 75 feet; face in clay and porphyry. Have started a cross-cut west from the last named drift, which is out 10 feet; face in porphyry. The raise from north drift, 1000 level, is up 18 feet; roof shows 3 feet of quartz, car samples of which assay \$20. Are repairing Potosi winze below the 1000 level. Are still retimbering the Ward shaft. Extracted and sent to the mill the past week 504 tons and 1750 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 508 tons. On hand at mill, 140 tons and 1750 pounds. Average battery assays, \$26.88; average car sample assays, \$29.05.

BULLION.—Are retimbering the Ward shaft 100 feet from the surface.

APEX.—Have sunk winze 20 feet during the week; total depth 40 feet. The ore increases in value as we go down. Promises of finding a large body of ore when we attain a greater depth are very encouraging.

EXCHEQUER.—Are retimbering the Werd shaft 100 feet from the surface.

WARN SHAFT.—Are retimbering the shaft 100 feet from the surface.

KENTUCK.—From the stope above the 160 level we continue to extract from two to three tons of ore per day of the average value of \$28 per ton as per car samples. The south drift from the Jacket east crosscut on 1100 level is in 191 feet and continues in ore of fair quality.

OCCIDENTAL.—The main north drift on 750 level has been extended 11 feet; total distance from the bottom of No. 1 winze, 698 feet; the face is in quartz and porphyry. Have stopped work in No. 2 winze from south drift, 750 level, and have resumed work in the upraise started above said winze. The raise is up 60 feet and top is in fair-grade ore. The Zedig drift, Sutor tunnel level, has been extended 15 feet; total length, 897 feet; formation, porphyry and clay.

CON. NEW YORK.—The winze below the 650 level is down on the slope 116 feet; the bottom is in quartz, some of which gives good assays. The west crosscut from the southwest drift from the shaft, 850 level, is out 126 feet; face is in hard porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week total distance from north line, 83 feet; face in hard porphyry.

Tuscarora District.

NAVAJO.—Times Review, March 31: The stope above the 350-foot level are yielding about the same, as is also the stope above the 150-foot level.

BELLE ISLE.—The stope above the 250-foot level are not looking quite as well as at last report.

NORTH BELLE ISLE.—The stope above the south 300-foot level has yielded about the same. North drift, same level, extended 11 feet; the face looks more encouraging.

Kennedy District.

THE OUTLOOK.—Walker Lake Bulletin, March 24: W. G. Wilkinson, who formerly mined in this county, writes as follows from Kennedy district, Humboldt county: The mining outlook is better here at present than it has been at any previous time. The imperial mine is now pretty well opened up for 400 feet along the ledge by tunnels Nos. 1, 2, 3, 4. No. 1 is in 85 feet; No. 2, 250 feet; No. 3, 80 feet, and No. 4, 100 feet, with a shaft down from No. 2, 50 feet, end all showing a ledge from 1 to 4 feet of good average ore. The Cricket, half a mile east, owned by the same parties—Kennedy, Benton & Co.—has a tunnel in 135 feet, with a ledge of the same grade ore. Then there is the Kearsarge, on the same ledge as the Imperial, owned by Wiggins & Blossom, that has a tunnel of 150 feet, showing a ledge and ore of similar size and character. The Alta, owned by Ed. Stone, adjoining and lying parallel to the Kearsarge on the west, is opened up by tunnel. Fifteen tons of ore are on the dump awaiting shipment as soon as the roads get so that teams can get in. The Gold Note, lying two miles to the southwest of those, is owned by Lawler, Dowdley & Co., and has a ledge of from 18 inches to 4 feet, of high-grade ore; also worked through tunnel. I have a claim of my own that I have run a crosscut tunnel 85 feet, and have out three stringers from 8 to 12 inches, that assay \$17 to \$23. I have yet to run 25 or 30 feet to get to the main ledge before I can tell what I have, but, like other prospectors, expect to strike it rich when I get there. The ore of this camp is mostly too low to ship at a profit, on account of being so far from the railroad, but would pay well to mill here, end, from the amount of work done, there appears to be an almost unlimited supply of ore that will go from \$10 to \$25, with a fair amount that will mill from \$50 to \$100. Kennedy & Co. shipped two carloads last fall that worked over \$80, and are getting out a three-carload lot now that will work as well or better than what they had worked, and between them and Stone, Lawler & Co., I think there will be regular shipments from here this season which will attract more

attention and cause more work to be done, and will be the cause of opening up other properties. I think we will have a mill here soon, which we need badly; then the district will speak for itself.

ALASKA.

FROM THE YUKON.—Jenneau Record, March 23: C. H. Hamilton and John Reed arrived in Jenneau last Monday from the Yukon. They were 40 days coming out, 10 days of which they were in camp, thus making their traveling time only 30 days. They did not bring any important news beyond what was brought out last fall. J. J. Healy's boat, with a trading and mining outfit, did not reach Forty Mile last season, but will arrive as early in the spring as possible. During the winter the miners enjoyed good health and the camp seems prosperous.

TAKOU.—Willis Thorp has leased the Takou Mining and Milling Co.'s property and intends running the mill this season. This property has been operated two seasons out of five. Ore was taken out in numerous places, or, in other words, the property was worked like a person digging a mess of early potatoes, by picking out the best hills. By so working, good returns resulted, but discord in the company resulted in its being shut down. It is hoped that Mr. Thorp will work the property on mining principles and develop it to its full capacity.

BERNER'S BAY.—Next week Mr. H. Mead will start for Berner's Bay for the purpose of making preparations for the commencement of the Berner's Bay Mining and Milling Co.'s 20-stamp mill. Mr. Mead is an excellent millwright and has done some excellent work in Alaska in that line. He put up the Silver Queen Co.'s mill at Sheep creek, on which the excellent workmanship and the arrangements for working cannot be surpassed. He was foreman of the chlorination works of the A. T. G. M. Co. and gave general satisfaction, and when the Berner's Bay mill is completed it will be safe to say that it will be second to none on the coast.

BONDER.—H. E. Hunsaker has given a lease and bond to J. F. Cryder, a mining man from Aspen, Colo., on his Ascension property, on Sheep creek. This property adjoins the Glacier mine on the southwest, the Golconda and Emma mines lying parallel with it on the north. Last season Mr. Hunsaker shipped a ton and a half of ore from the Ascension to the Tacoma Smelting Works that gave returns of about \$100 per ton. This is a good proposition, with considerable good ore in sight.

ARIZONA.

THE OUTLOOK AT WHITE HILLS.—Moheve Miner, March 30: There has been a rumor current on the streets this week that the White Hills Company had discharged all its men and that the mines had been shut down indefinitely. There is absolutely no truth whatever in the report. From late advices received regarding the mines at White Hills everything indicates that the camp is in a thrifty condition, and the prospects are quite favorable for continued prosperity. The company has laid off eight or ten men, not because of any abatement in the mineral output, but because they are doing considerable dead work and have not room for more men until this work is completed. An air shaft is being sunk for the proper ventilation of the G. A. R. mine, as it is not considered safe to continue working in the lower levels under the present system of ventilation. As soon as this air shaft is completed a larger force than ever will be put on end large quantities of the precious metals will be extracted. All the mines in Indian Secret, Weaver and Minnesota districts, together with those of the new gold discoveries 12 miles north of White Hills, are looking better than ever, and it is said by competent judges that this year will see an era of prosperity in that region never before equaled in the history of Mohave county. Frank Feeler is now foreman on the Occident and Horn Silver mines at White Hills. There are about 20 men working on these two mines and more will be added as rapidly as the ground is opened for their accommodation. Conkey & Tyler have completed their lease on the Prince Albert mine at White Hills and will shortly resume operations on a claim owned by them situated on the Canyon Station divide, near Mineral Park. The claim is known as the Lalyng and has produced good ore when worked. Oscar Cowan returned from his prospecting trip along the Colorado river below Needles Tuesday. He does not report any rich strikes, but he found several good-looking ledges during his trip. John Sullivan, who accompanied him, will visit the Harqua Hala country before returning. By Collins, recently returned from the Blackfoot mine, Todd Basin, informs us that that property is producing some exceedingly rich ore—some of it runs 60 ounces in gold and over 500 ounces in silver per ton. Of course this is the first-class ore. Messrs. Stinson & Jimmison have out over a carload and will make a shipment some time this month. The Senator Gold Consolidated Mining Co., of Gold Basin, has just ordered 50,000 feet of lumber for the erection of a ten-stamp mill at the mouth of Salt Wash, 13 miles east of the mine.

BRITISH COLUMBIA.

HIDDEN TREASURE SHOWING.—British Columbia Miner, March 30: Most encouraging reports continue to be brought from the Hidden Treasure. On Sunday, when the owners visited it, the vein had been crosscut for six feet, showing nice concentrating ore all the way. An inch or two of shale was then encountered, and, after this was crosscut, vein matter was again met, carrying ore of a better grade. It appears to be getting richer as the hanging wall is approached. Some very nice specimens were brought down, rich in peacock and gray copper. By the time the hanging wall is reached, the Hidden Treasure will have one of the big-

gest showings on Toad mountain. From the calculations made before starting the tunnel, the vein should be 16 feet wide. If this is so, it is only half crosscut, and the indications are that a very rich streak will be found in the hanging wall. About a month ago the Hidden Treasure was sold for \$1500; now, \$30,000 could not buy it. The owners, immediately after purchasing, set to work and they fully deserve their luck. They have added another to the unusually rich claims on Toad mountain, and uncovered a body of ore unparalleled, except in the Silver King, and the whole camp will reap the benefit. The Hidden Treasure lies about 2000 feet due west of the Silver King, which it parallels, and in the western extension of the Democrat, and is the second extension of the Goldendale. It is possible that it is the same lode which was shown up on the Goldendale last summer.

DAKOTA.

SALE OF MINING PROPERTY CLOSED.—Deadwood Pioneer, March 30: The deal for the Treadwell Fraction and Blunderbuss, Little Nell and Lewis lodes, was formerly closed yesterday, J. S. Childs, superintendent of the Harney Peak Tin Company, being the purchaser. As indicated in these columns yesterday, the Treadwell and Blunderbuss were owned by Daniel Flickinger, and the Little Nell and Lewis by John Delaney, Gus Oberg, John Clancy and Arnold Lewis, and it is authoritatively stated that the price paid for the four claims falls but little short of \$65,000, constituting one of the most important sales in the Hills. Mr. Childs took a hand on the properties some months ago, and although considerable development work has been done since that time, the purchase, he informs a Pioneer reporter, was made mainly on the reports of Prof. Walter P. Jenny, who has carefully inspected all the properties. These inspections, in which were embraced numerous tests of all the various ore deposits exposed, assayed in no instance below \$30 to the ton, and in several cases ran as high as \$400. In speaking of his purchase yesterday, Mr. Childs said: "I have bought these properties as a personal investment, and reports to the effect that the purchase is for other parties are entirely erroneous." Continuing, the gentlemen said he had been attracted to the properties by quiet reports of their value, and some time ago determined, if they could be had at a reasonable figure, and held up as well as he was led to believe they would, that he would buy them. He has not fully decided as to their operation, but left for home yesterday feeling that he had secured some mining property as rich as is to be found in the Black Hills. Changing the conversation to the subject of the Harney Peak tin property, Superintendent Childs said: "You may quote me, if you wish, as saying that the present shut-down is not permanent, although I cannot say when operations will be resumed." Continuing, Mr. Childs said there are at present at work, keeping the various mines clear of water and looking after the property in a general way, about 30 men, and that he has no idea this force will be reduced. Superintendent Childs smiled at the report that he had severed his connection with the Harney Peak Company, remarking that this was the first he had heard of it. In conclusion, he expressed the opinion that operations would be resumed on a larger scale than ever before, the time and extent of which, however, rests entirely with the stockholders.

MONTANA.

PURITAN.—Phillipsburg Mail, March 30: There has not been much to report about the Puritan Company for two months past; but if the vein of ore struck in the east crosscut from the 300-foot level continues to improve as it has done in the past two or three days, there will be plenty to say about the company and its property. It is the hope of all that the Puritan has seen its darkest days, and certainly the management is deserving of reward for the faithful manner in which the "dead" work has been carried on. Since the present management took hold of the property it has done about 1300 feet of underground work, and for a long time hoisted an average of 90 buckets of ore a day; but the ore in the upper levels seemed to be in pocket formation and did not hold out, consequently sinking was continued to the present depth, where there is every indication of permanency to the leads that come together in the east crosscut.

PLACER MINING.—Considerable placer mining will be carried on in various parts of Montana during the season which is soon to open. J. R. Mackey and others are preparing to start operations in Washington gulch, and from other sections we learn that the placer-mining industry will take renewed life this season.

OREGON.

MORE NUOGETS.—Rogue River Courier, March 30: Jeff Hayes and Chas. Swindon brought in two nuggets of gold from their placer on Oscar creek last week, one of which weighed 13½ ounces and was valued at \$220. The other was somewhat smaller. The large nugget was shaped and sized like an Eastern oyster and contained some quartz which was imbedded in the yellow metal. The placer is in the same vicinity as that in which the \$365 nugget was found a few days previously by Broder Custar. The streams emptying into the Applegate and Williams creeks are simply full of gold. On Monday a 4½-ounce nugget was brought in from the same place.

WASHINGTON.

STUCK IN RICH.—Okanogan Outlook, March 25: The Rush mine on Mt. Chacapa is coming to the front with rapid strides. In the crosscut on the 125-foot level a seam of very rich ore was encountered last week near the hanging wall, and Mr. M. G. Barney, one of the owners, who has been stopping at the mine for the last two weeks, brought down several hundred

pounds of the ore, some of which is as rich in free gold as anything yet found in this section. The ledge at the point of crosscut is about 12 feet wide, with over eight feet of ore. The pay streak on the hanging-wall is five feet in width. The discovery of the yellow metal in such large quantities at this depth is very encouraging, to say the least, and the owners of the property, who have had every faith in the mine from the start, are to be congratulated on their good fortune. Development of this property will be continued with renewed vigor, and there is small room to doubt the ultimate result. The Rush group of mines, as a paying and permanent institution, is practically assured.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 23, 1893.

- 494,455.—APPARATUS FOR DISTRIBUTING WATER.—F. M. Barkhaus, Jr., Wrights, Cal.
- 494,466.—INDEX.—L. L. Dennick, Los Angeles, Cal.
- 494,470.—HEATING ATTACHMENT FOR GAS-BURNERS.—Geo. Edwards, Berkeley, Cal.
- 494,474.—LIQUID SHAKING MACHINE.—E. H. Gerrish, S. F., Cal.
- 494,421.—HONEY-EXTRACTOR.—O. M. Hill, Santa Paula, Cal.
- 494,205.—SALT BOX.—W. L. Johnson, Pomona, Cal.
- 494,436.—SUBROIAL APPLIANCE.—Frank Orth, Astoria, Or.
- 494,437.—SUBROIAL APPLIANCE.—Frank Orth, Astoria, Or.
- 494,456.—FANNING COVER FOR BEDS.—R. B. Parrish, Portland, Or.
- 494,487.—SAW-FILER.—A. G. Phillips, S. F.
- 494,534.—CASH-REGISTER.—E. T. Taylor, Oakland, Cal.
- 22,308.—DESIGN FOR SPOON HANDLE.—W. S. O'Brien, S. F.

The following brief list by telegraph, for Mar. 23, will appear more complete on receipt of mail advices:

California.—William T. Armstrong, Lerdo, cheese-making apparatus; Theodore Bessing, Los Angeles, gymnastic apparatus; John A. Bliz, Pleasanton, two-wheeled vehicle; James Dowdell, St. Helena, apparatus for making wine; John Martin, Berkeley, grate; James L. Morris, Tiburon, lubricator; J. L. Morris, S. F., lubricator; J. E. Brown, Ferndale, animal poke.

Oregon.—John H. Peterson, Portland, sewing machine.

Washington.—Geo. A. Miller, Colfax, apparatus for excavating wells, etc.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SAW-FILER.—Andrew G. Phillips, S. F. No. 494,487. Dated Mar. 23, 1893. This is one of that class of saw-filers in which a suitably guided reciprocating frame carries an adjustable connected file. The object of the invention is to provide a saw-filer the frame of which can be adjusted in order to place and guide the file at any desired angle, said file being so mounted that it can itself be adjusted vertically and lengthwise, and to the desired pitch, being regulated in its operation by suitable gauges and indicating devices to cut each tooth equally and to the proper angle and depth.

APPARATUS FOR DISTRIBUTING WATER FOR IRRIGATION.—Frederick W. Barkhaus Jr., Wrights, Santa Clara Co. No. 494,455. Dated March 23, 1893. This consists of a series of communicating tanks having each a vertical series of corresponding outlets, each series being adapted to discharge into its own channel, and a vertical series of separately controllable discharges for the communications of the tanks, so located with respect to the outlets as to distribute the water from each tank through the equivalent outlets in the vertical series of each. The object of this invention is to provide an apparatus for irrigating purposes in which the water may be equally distributed throughout a given area and its distribution regulated and adjusted to the amount of initial supply. It is applicable in all situations, but is especially adapted for use on side hills.

CASH REGISTER AND INDICATOR.—Edward T. Taylor, Oakland, Cal. Dated March 23, 1893. No. 494,534. This invention relates to improvements in cash registers and consists of rotary drums having spirally arranged rows of figures around the periphery, and indicators which are advanced by crows so that their side movement coincides with the advance of the figures upon the drums, and the whole amount received during a day or other period can be ascertained at a glance. The rotation of the drums is effected by depression levers and gearing connecting the levers with the drums, and the distance to which each lever is depressed is regulated so that the drum will be rotated to show an addition corresponding with the amount marked upon the key of the hand depressed. Locking plates permit the movement of more than one key at a time, and other mechanism insures the unlocking and opening of a cash drawer to receive the amount collected. In connection with these devices are a series of indicating plates which are thrown up into corresponding openings whenever a key is depressed, to show the amount received.

Market Reports.

The Markets.

SAN FRANCISCO, April 6, 1893.

COPPER—In the copper market there is evident a general feeling of apathy, not alone on the part of consumers, but of producers as well. Plenty of Lake is to be had at 11¢ and some ingot copper stored in New York might be had a little cheaper. Casting copper must still be quoted at 10½¢ to 11¢, according to quantity and quality, while Arizona refined copper is held at about 9¢ to 9½¢. Furnace material continues to be rather scarce, although, in Butte, that the Anaconda and St. Lawrence mines have commenced hoisting ore at an average rate was correct.

In Europe the demand is decidedly better than here. In the forepart of the week values of G. M. B.'s declined to £45, but closed firmer at £45 10s for spot and £46 for three months' prompt. In contrast with the good demand for fine and best-selected brands of copper is the fact that unrefined and common tough are offered in excess of requirements.

Coinage.

The coinage of the San Francisco Mint in March was as follows:

Descriptions.	Amount.
Double eagles.....	\$1,000,000
Eagles.....	250,000
Half eagles.....	400,000
Total.....	\$1,650,000
January.....	3,100,000
February.....	2,640,000

Since Jan. 1st.....\$7,390,000
Same time in 1882.....7,036,189

Increase, 1893.....353,811
The total for the same time in 1891 was \$11,173,556.

Silver in March.

The following shows the daily prices of silver in New York and London during the month of March:

Date—	New York.	London.
1.....	83½c	38½d
2.....	83½c	38½c
3.....	83½c	38 5/16
4.....	83½c	38 5/16
5.....	83½c	38 5/16
6.....	83½c	38 5/16
7.....	83½c	38 5/16
8.....	82½c	38 3/16
9.....	83½c	38 3/16
10.....	83½c	38 5/16
11.....	83½c	38 5/16
12.....	83½c	38 5/16
13.....	83½c	38 5/16
14.....	83½c	38 5/16
15.....	83½c	38 5/16
16.....	83½c	38 5/16
17.....	83½c	38 5/16
18.....	83½c	38 5/16
19.....	82½c	38 5/16
20.....	82½c	37 3/16
21.....	82½c	37 3/16
22.....	82½c	37 3/16
23.....	82½c	37 3/16
24.....	82½c	37 3/16
25.....	82½c	37 3/16
26.....	82½c	37 3/16
27.....	82½c	37 3/16
28.....	83 1/8	38 1/8
29.....	83 1/8	38 1/8
30.....	83 1/8	38 1/8
31.....	Holiday	

The London quotations are per ounce 92½ fine, and 1000 fine in New York. The highest and lowest prices for the month were as follows:

	London.	New York.
Highest.....	38½d	83½c
Low st.....	37 9/16	81 7/8

Difference.....13/16d 1½c
*Lowest on record.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.....	@ 14	English, B.....	@ 18
BOREX.		COAL.	
Refined, in car lots.....	@ 71	Spot from yard—PER TON.....	@ 84
Powdered, do.....	@ 71	Wellington.....	80 00
Concentrated, do.....	@ 61	Greta.....	7 50
All grades jobbing at advance.		Namaimo.....	6 50
COPPER.		Oilman.....	6 50
Bolt.....	@ 22	Seattle.....	6 50
Sheathing.....	@ 22	Cosco Bay.....	5 50
Ingot, jobbing.....	@ 14	Cannel.....	5 50
Do, wholesale.....	@ 13	Egg, hard.....	12 00
Fire Box Sheets.....	@ 24	Chamberland, in sacks.....	15 00
IRON.		Do, bulk.....	14 00
Bar, base.....	@ 3	Walrus.....	7 25
Norway, base.....	@ 41	Scotch Split.....	7 50
PIG IRON.		Hydrate.....	8 00
Eglinton 3 ton.....	20 00	West Hartley.....	8 00
Glenagair.....	21 00	TO LOAD—PER TON.	
Am. Soft, No. 1.....	22 00	Australia.....	6 37 1/2
Oregon Pig.....	22 00	Liverpool Steam.....	6 50
Fuget Sound.....	20 00	7 Scotch Split.....	00 00
Clay Lane White.....	21 00	Cardiff.....	5 25
Langdon.....	22 50	Lehigh Lump.....	11 00
Thorndell.....	23 00	Cumberland.....	12 00
Gartaberrie.....	23 50	Do, in sacks.....	10 00
Barrow.....	22 50	West Hartley.....	50 25
Carbone.....	22 00	COKE.	
CHROME IRON ORE.		English, to load.....	29 00
Per ton.....	10 00	Do, spot, in bulk.....	29 00
LEAD.		Do, in sacks.....	29 00
Pig.....	@ 41	Cumberland.....	9 50
Bar.....	@ 51	QUICKSILVER.	
8 best.....	@ 71	Home trade, pr.....	@ 42
Pipe.....	@ 61	For export.....	35 50
SILVER.			
Drop, sizes smaller than			
B, 1/2 of 25 lbs.....	81		
B, 3/4 of 25 lbs and larger sizes			
8 1/2 of 25 lbs.....	2 00		
Buck, 1/2 and larger sizes			
do, 3/4 of 25 lbs.....	2 00		
QUICKSILVER.			
Home trade, pr.....	41 50		
For export.....	35 50		
	@ 42		

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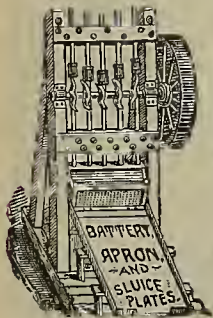
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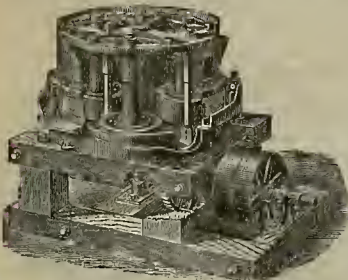
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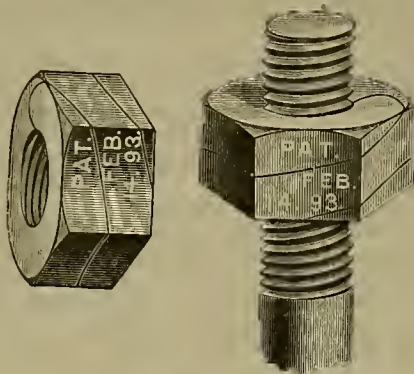
An Automatic Safety Stop.

The automatic safety stop illustrated on this page can be attached to any Corliss governor, in any position, so that the lever of the stop supports the weight of the governor. The stop is controlled by the motive agent of the engine and adapted to support the governor sleeve when the motive agent is shut off. Fig. 1 of the engravings is a side elevation of the improvement as applied. Fig. 2 is an enlarged transverse section of the same on the line 2-2 of Fig. 1. Fig. 3 is an enlarged view of the face of the stop. Fig. 4 is a transverse section of the same on the line 4-4 of Fig. 3.

The engine *A*, of any improved construction, is provided with the usual governor *B*, or any other governor, connected with the valve mechanism of Corliss type of engine or with the valve stem of throttling governors, so that further description of the same is not deemed necessary. The governor *B* is provided with its usual sleeve *C*, adapted to rest on a stop preferably made in the shape of a lever *D* when the steam is shut off by the engineer. When, however, an accident happens to the governor while the engine is running, the stop *D*, being from under the sleeve *C*, permits the governor to drop sufficiently so as to completely shut off the steam from the engine.

It is understood that the stop lever *D* supports the sleeve when the steam is shut off by the engineer closing the valve; then the valves of the engine are still in position to take steam as soon as the engineer again opens the

through the pipe *G* into the tube *F*, the latter swings outward at its free end as shown in dotted lines in Figure 3, thus exerting with this free end a pull in the extension of the lever *D*, whereby the latter swings from under the sleeve *C*, to permit the latter to drop below its normal



RICHARDS' IMPROVED LOCK-NUT.

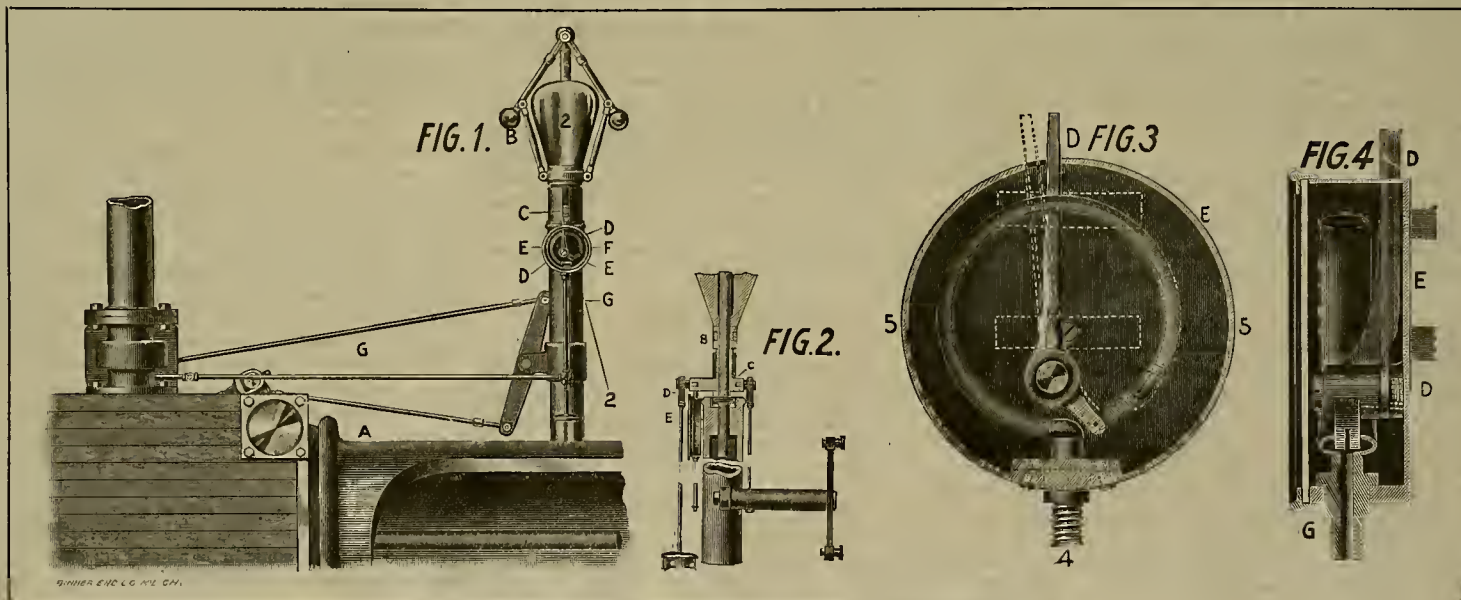
governor in the proper position for starting the engine. The Parke & Lacy Company act as agents for this device.

An Improved Lock-Nut.

A lock-nut invented by George O. Richards of Sisson, Shasta county, which is illustrated on this page is a radical departure toward simplicity of form and apparent effectiveness. The nut really consists of a coiled spring, the nominal interior diameter of which is less than the diameter of the bolt it is to fit, the spring being internally threaded to fit the threads of the bolt. The coils of the nut or spring may be one or more in number and its exterior contour may be curved or angular. It may be round or polygonal and its sides may be straight or inclined as desired. The preferable form is that of an ordinary nut as shown. The thread of the nut which is adjacent to the face which enters first on the bolt is made of a slightly larger diameter than the other threads, so that at its entrance thread the diameter of the nut is large enough to permit it to be entered upon the bolt end; or the end of the bolt itself may be slightly tapered. Then by screwing the nut it will expand and feed itself upon the bolt, fitting very tightly thereon so that it will not be jarred loose.

This is designed to be used upon the outside of an ordinary nut to be locked and effectually prevent it from working off the bolt, especially on bridges, wagons or cars where the plain nut tightens against the wood-work and the vibration is great. It finds also a ready application on fish-

position in case of accident to the governor. As soon as the motive agent is cut off from the pipe *G*, by closing the valve in the inlet pipe to the cylinder, then the tube *F* is relieved of the pressure of the steam and consequently its free end contracts so as to move the lever *D* back to its



AUTOMATIC SAFETY STOP, AS APPLIED TO CORLISS ENGINES.

valve to start the engine. This stop lever *D* is controlled by the motive agent, and for this purpose the following arrangement is made: The lever *D* is fulcrumed within a casing *E*, attached to the support of the governor, as plainly shown in Fig. 1. The lever *D* is provided with an extension pivotally connected by a link with the closed end of a spring tube *F*, preferably bent in the shape of a segment of a circle, as plainly shown in Figs. 1 and 3.

The spring tube *F* is arranged within the casing *E*, and is connected at its open end with a pipe *G*, leading to the supply pipe or other part of the steam chest, so that the motive agent can enter the said pipe *G*, whenever the valve controlling the inlet of the steam through the inlet pipe is opened.

Now it will be seen that when the motive agent passes

normal vertical position, as illustrated in Figure 3, to support the sleeve *C* in a normal position.

It will be seen that while the engine is running, the lever *D* is swung from under the sleeve *C* by the pressure of the steam in the spring tube *F*, so that in case of accident to the governor *B*, the latter can drop sufficiently to throw the cams on the knock-off levers into action, so that the steam hooks cannot catch and open the valves, thus cutting off the steam supply and thereby stopping the engine.

When the engine is running normally and the lever *D* has swung from under the sleeve *C*, as above mentioned, and the engineer shuts off the steam from the supply pipe, then the lever *D* swings back into its normal position before the engine comes to a stop, so that the lever *D* is ready to receive and support the sleeve *C*, thus holding the

plates of rails. This can be used as a lock-nut by itself and without the ordinary nut, since it locks itself securely in the place where it is left after being screwed up. Its formation is such that it is expanded when screwed on and its spring-like compression keeps it in place so that vibrations cannot readily jar it from its position. There is no great degree of expansion but enough to make the spring, of which the nut itself is formed, grip tightly on the bolt. The inventor has assigned an interest to R. A. Shade, of Sisson, and J. N. Vannoy, of 1029 Laguna street, San Francisco, owner of a third of the patent who handles the interests of the other parties. It is the intention to have these manufactured on a large scale in the East. The device is quite simple in character and appears to be effective for the purposes for which it was designed.

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W. B. EWER, } EDITORS
 O. H. G. YALE, }

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San Francisco, April 15, 1893.

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Comment.

There are a good many low-grade gold ledges scattered here and there over the State of Nevada, but little attention has been paid them heretofore because silver was the first attraction and low-grade gold ore was not looked upon as profitable. It is more expensive mining in Nevada than in California, but of late years we have got the business down to a very fine point here on gold ore and our Nevada friends might profit by our experience and open their gold claims. "Gophering," however, is not the way to do it. The mines must be properly opened and economically managed. Comstock methods would be disastrous with a low-grade gold proposition. It is only by strict economy and care that such claims can be made to pay, but there is no discount on the product, and every dollar's worth of metal is really worth a dollar.

The most famous gold-producing mine in California is the Idaho of Grass Valley, which has produced about \$12,000,000 and paid nearly \$5,500,000 in dividends. There are only 3,100 shares in the mine and this month the 273d consecutive dividend was declared, the last dividend being \$3 per share. At the meeting of the directors this month, Mr. Edward Coleman, who has acted as superintendent since 1865, resigned his position, and Mr. Eugene C. Oreller, who has been with the mine since 1870, and was the amalgamator, was chosen superintendent. During Mr. Coleman's superintendency, the mine has yielded upwards of \$11,000,000. After a trip to the World's Fair he will come to San Francisco to reside. It was due to Mr. Coleman that machine drills were introduced at the Idaho, and he was also instrumental in bringing in the water-power system. It is seldom that one hears of a man sticking so steadily to a mine—even a good one. The mine has been carefully and intelligently managed all these years, as its record shows.

It looks very much now as if the next mining "excitement" would be up in British Columbia, in the Slokan country and Kootenai region. A great many miners are looking in that direction and there is much inquiry for detailed information. This will doubtless result in the development of a great amount of new territory, as prospectors will not content themselves with staying in the main camps, but will scatter over the whole region. A number of California men have already gone to British Columbia to examine properties or take charge of them. The Northwest expects this year quite an accession to its mining population.

THE Leek mine, in Yavapai county, Ariz., is said to be showing up the greatest silver strike west of Aspen, Colo., the ore running over 1000 ounces on a 3½-foot ledge.

To Obtain Gold Mining Laws.

A mining congress will be held in Salt Lake City, Utah, on Sept. 11th. It is designed to have all kinds of mining discussed by this body, and all matters relating to any kind of mines read and printed for use all over the United States. It is proposed to have papers read by eminent mining engineers, but this is done every year by the American Institute of Mining Engineers. A more practical idea, to our mind, would be for a mining congress to take up the subject of the mining laws, rulings of the department, etc., and appoint a good strong working committee from the various States to formulate some plan by which the laws could be intelligently overhauled and put in shape. At present the rulings of the Secretary of the Interior and the Land Office seem to have taken the place of the general laws or to have perverted them. The laws themselves are crude in form and contradictory or obscure. The whole thing is very unsatisfactory to the entire mining community all over the United States.

The senators and members of Congress who have "tinkered" with the mining laws since 1872, have worked in the dark with insufficient knowledge of the subject. None of them have done any good for the mining industry. Senator Stewart seems to be looked upon as the only one with any knowledge of what the miners want, and his bill, which has been pending several seasons, is very unsatisfactory, indeed, doing great injustice to several branches of mining.

Its provisions, as far as they relate to drift gravel mines and the petroleum industry, if carried out, would practically annihilate both these branches. The objections have been brought to his attention, but he has not seen fit to make the desired changes. Altogether his attempt to formulate a mining law to take the place of the Act May 10, 1872, is eminently unsatisfactory.

The miners themselves have never organized to bring to the attention of Congress what they want. A Mining Congress would be in the position to ask for what miners need and do it intelligently. This could not be done in two days, but a carefully selected committee could formulate a general law which Congress would pass. This is much more important than the reading of papers by mining engineers or the passage of resolutions about free coinage. This latter question has occupied almost the entire time of previous mining congresses. It has got into politics now and out of the hands of the miners. Let the miners confine themselves to questions affecting the entire mining community, and their demands will be heeded. They could call forcible attention to the absurd department rulings and judge-made law which injure their industry and Congress would give them some relief. They will never get it until they ask for it and individual petitions count for nothing. It takes organization to accomplish anything in these days. Witness the result of the work of the California State Miners' Association on the hydraulic mining subject. The companies had been fighting for their rights for years with no result. When, however, they all combined and perfected an organization of some 4,000 or 5,000 men, both Congress and the State passed laws affording them relief. The same thing can be done with the general mining laws, if the miners hand together and tell Congress what they want.

California Gold Mines.

There is more money being paid out at Nevada City now by the various mining companies, than at any period during the past ten years, and the indications are that the payrolls will be largely increased in a very short time. This statement is made on the authority of the Nevada City Transcript, and is worthy of more than passing notice, because the region around Nevada City and Grass Valley is the center of the gold mining industry in this State. With increasing prosperity there it ought to follow elsewhere. This is one of the signs we have been expecting of a revival of interest in gold mining in California. It is bound to come, for nowhere else in the United States is there a gold-bearing belt of such magnitude and possibilities. With silver, lead and other metals in a depressed condition, mining capitalists are turning their attention more to gold properties for investment. Of course Colorado, Montana, Utah, Oregon, Arizona and Idaho have more or less gold mines, but the aggregate product of all these does not nearly reach that of the mines of California. California is still the leading gold producer of the Union, notwithstanding the comparatively light yield of recent years, caused by the total stoppage of the hydraulic gravel mines.

The gold belt of this State extends from Siskiyou to San Diego. In certain portions of the belt the developments have been more extensive than in others, but there are possibilities along the whole line. In the southern portion of the State interest is now turned more to mining

than it has been and capital is opening the properties. In the extreme northern portion, too, in Shasta, Siskiyou and Trinity counties particularly, more mining is being done than ever before. In the older mining counties there is renewed interest, as the news from Nevada county indicates. Preparations are being made to rehabilitate many of the old hydraulic mines, and though little can be expected from them this year under the new legal conditions, in time they will add materially to the gold yield.

Everything points to a general renewal of interest in the gold mines of the entire State. Gold mining is one of the industries of California which has been comparatively neglected for some years, but outsiders are now coming in and they will do what our own capitalists have failed to do—invest in gold properties.

Foundations on the Water-Front.

Engineers and architects have been much interested in the subject of the proper foundations for large buildings along the water-front of this city. It has been a problem only brought up of late years when more substantial structures became necessary. The old wooden houses which were built before the seawall was constructed stood well enough on the piles or "fills," but they had slight weight. But in the new era now upon us better buildings are demanded for warehouses, offices, stores and depots. Most people have heard of those pioneer days when "the water came up to Montgomery street," but few realize that all of the city below that street extending to the seawall is upon made land. Below Sansome street it is necessary to have pile foundations for all large buildings, and the further one goes toward the bay the softer becomes the bottom, for it is really the hay-mud. Everything is filled in now to the seawall, but outside of that the mud is very deep and unusually long piles have to be used. The deepest mud is off Howard-street wharf, but at the ferry slips, foot of Market street it is considerable distance to hard-pan.

The new ferry depot at the foot of Market street, for the construction of which the State has given the Harbor Commission permission to issue bonds for \$600,000, will all be built outside the seawall, its inner or shore edge alone resting on the wall. Experiments have been made by Chief Engineer Howard C. Holmes of the Harbor Commission, to establish the character of the material on which the foundations of the building must rest. Piles are to be driven and cut off twenty-six feet below the city base line, and on these are to be placed the concrete piers forming the foundation for the depot. In February a pile sixteen inches in diameter at the largest end and eight inches at the smallest and ninety-two feet in length was driven in the space occupied by the approach to the new ferry slips. The conditions were as follows: Distance from top of pile to mud line, nineteen feet, said top being three feet below city base, making the end of the pile ninety-five feet below city base and seventy-three feet in the mud. The last fall of the piledriver hammer was twenty feet and the pile was driven three inches. The weight of the hammer was 2900 pounds. A platform four and a half feet wide by twelve feet long was built around the pile and loaded with pig iron to the extent of 90,000 pounds, or forty-five tons. After a twenty-four hour test, comparison levels were taken, with the sea wall as a basis of operations. No perceptible change had taken place. The first pile tested was only sixteen inches in diameter, while eighteen inches is the size to be used when the work is done; the test was only ninety-five feet below city base and seventy-three feet in the mud, while the plans and specifications for work call for 106 feet below the city base line and eighty feet in the mud. The conclusions reached from these experiments are that the pile foundations for the concrete piers to support the building, will successfully answer the purpose. Many thousand piles will be used on the foundation and will be very expensive. The funds for this will be furnished by the commission, and will not come out of the \$600,000, as this sum will be devoted to the depot building proper.

Dredging California Rivers.

Liverpool is removing the bar at the mouth of the Mersey river with an immense suction dredger, which is, in fact, a large steamer having hoppers to hold 3000 tons of sand. Two centrifugal pumps with suction and discharge pipes, driven by powerful engines, lift the sand and water and deposit it in the hoppers, the water flowing off and leaving the sand. When loaded the dredger steams outside with her own power and propellers, and the contents of the hoppers are discharged into the deep waters of the ocean. The Call of this city thinks a dredger of this type would keep pace with the hydraulic tailings in California and could be used to dredge our rivers, as the large one described has a capacity of raising 4000 tons an hour, or 96,000 tons in 24 hours. These figures are misleading, however, since even if the pump can raise 4000

tons an hour the hoppers of the dredger only hold 3000 tons, and it would take several hours longer for the vessel to make her trip to discharge than it would take to load. Depending on the distance to the discharging point, she might not be able to make more than three or four trips a day, which would cut down the total daily dredging capacity very materially.

But it is doubtful if a suction dredge could properly handle the material in the California rivers under the existing conditions. A machine of the Liverpool type could not be used since she must have a deep place to deposit her load, and it would not pay to move material from one point and deposit it elsewhere in the same river. There is nothing to be gained by that. The plan would answer in the bay with an ocean outside for a dumping ground, but the conditions differ in the rivers. Moreover there is a limit to the height above the water surface at which centrifugal pumps can lift as a deposit material dredged. In the Liverpool instance the dredgings are only elevated a few feet above the surface of the water and dumped into a hold which is below surface level. In the case of the rivers the dredgings would have to be forced through a pipe out on to the adjacent lands. If the banks of the river were high this could not be done with the suction type of dredger. Where there are low banks it is possible, of course, and the dredgings could be forced away laterally a mile or more. But the river bottoms are formed of hard compact sand intermingled with rocks, roots and all sorts of stuff, difficult for a suction dredge to handle. In soft mud, with a low lift, the suction dredges answer admirably, as we are illustrating daily at Oakland, where there are now three of this type at work, two on government harbor contracts and one on a city contract in the lake.

But when the material to be dredged is compact sand, clay or other "stiff" substance, the endless chain and bucket dredge answers better than the suction type. The sand can be elevated to a hopper and thence discharged through a pipe to a distant point, water being added in the hopper to assist the flow. It is probably this type of dredge which would have to be used on our rivers to remove the debris from the beds. It is doubtful, however, whether any very extensive dredging would be done in the California rivers except at such points where large deposits have accumulated and formed shoals. Dredging is a costly operation at best. Before any would be commenced, it would be necessary to build dams above navigable points to keep the debris now in the rivers from coming further down.

The different types of dredge designed and built in California are as good as any in the world. The dredging machinery which did the best work on the Panama canal was designed and built in this city at the Golden State and Miners' Iron Works. The suction and bucket types in use here are very efficient, and reflect great credit on their designers and builders.

Foundry Notes.

The Risdon Iron Works have recently sent several Bryan mills to Mexico, and report quite a demand for this special make of roller mills from different parts of the coast. Their business in this line has increased largely of late showing an apparent improvement in the quartz mining industry.

The housed-over hulk of the burned steamer Eastern Oregon, was towed down from Seattle in 5½ days by the steam collier Willamette. The Eastern Oregon was taken to the Union Iron Works, where she is to be rebuilt. The vessel caught fire on the night of December 1, 1891, while on the dry dock at Olympia, on Puget sound. The fire was caused by burning fat in the galley. For a long time afterward it was hardly thought that the wreck was worth repairing. About two months ago experts pronounced the hull worth handling and the hulk was ballasted and housed over with a top like an inverted V. The Willamette was only a day and a half longer with the Eastern Oregon in tow than on her regular trips. The Eastern Oregon was formerly the steamer City of Palatka and ran on the coast of Florida. She registers 577 tons net, and was built at Chester, Pa., in 1883. The dimensions are: length, 200 feet; beam 34½ feet, and depth of hold, 11.9 feet. The Union Iron works have quite a job on hand to repair and again fit the vessel for sea.

Mr. Irving M. Scott, of the Union Iron Works, who has returned from Washington, though he thinks it will be a year before any more large ships are provided for, is of the opinion that the administration will continue the policy of building up our navy. He says Secretary of the Navy Herbert, by reason of his long experience as chairman of the Committee on Naval Affairs, is the very man to take up the work so nobly begun by Secretary Tracy. Mr. Scott says: "Shipbuilding of to-day and a quarter of a century ago are very different. We in the business have great trouble in selecting designs and materials by reason of the fact that so many experts disagree as to the best

and most lasting style of architecture. But the vessels we have would be hard to improve upon. Some few mistakes may have been made, but, on the whole, every member of the white squadron will answer the purpose for which it was built. Since the Monterey has been set afloat, we have proven that good ships can be built here on the coast, and I believe that the policy of the new administration is to divide the work as fairly as possible. Shipbuilding here should be a matter of State pride, and I am more than pleased with the outlook. The Atlantic coast will no longer have a monopoly in the business. The naval authorities are familiar with our facilities here, and I sought to impress upon them our claims to their consideration in the distribution of public moneys. This affects the masses more directly than the distribution of public patronage. Mare Island will receive attention, and the people should lose no opportunity to impress upon the Congressional committee, which is about to visit the coast to look for a new harbor, the need of placing the forts we now maintain in a good condition. We can get appropriations if we go after them, and need not expect help unless we ask it. I do not think that the administration will be so miserably as some may expect."

A Huntington mill was shipped last week to De Lamar, Idaho, and another to Ophir, Placer county. Mr. Frank A. Huntington, the inventor and manufacturer of these mills, was the first man to bring the roller type of mill into general practical use and to prove its efficiency as compared with stamps. He had up-hill work for a long time as there was a general prejudice against all quartz-crushing appliances except stamps. It took him several years to prove that he had a good, practical machine which could compete with stamps. The prejudice once removed, however, Mr. Huntington found he had built up for himself a fine business which has since continued. His mills are now in use all over the world, and other inventors have followed his lead in perfecting various forms of the roller type of quartz mill. The record of the cheapest milling of gold quartz in the world—that of the Spanish mine, Washington township, Nevada Co., in this State—is held by the Huntington mill; and the record of the cost in that case is far below any ever made with stamps.

THE MINING CONGRESS.—It has been decided to postpone the Mining Congress at Salt Lake from June 5th to Sept. 11th to 14th inclusive. This postponement was made because of the holding of the Trans-Mississippi Congress at Ogden on April 14th and there not being time after that to communicate with the Governors in the States and have the appointment of delegates made, since many of the Governors will be in Chicago at the World's Fair in May. Besides, there would not have been time for the preparation of papers on mining subjects of all kinds by the best-known mining men of the country, as desired. It is expected also that eminent mining men from all parts of the world will visit the World's Fair, and they will be invited to prepare papers for this Congress, thus putting an international character on the meeting.

THE English, Scottish and Australian Chartered Bank has failed with liabilities amounting, it is said, to £8,000,000 or \$40,000,000. No estimate of assets has yet been made, but they are supposed to be large. The suspended bank has main branches at Sydney, Adelaide, Brisbane and Melbourne and at various lesser points in the colonies of New South Wales, Victoria and South Australia. It transacted a banking and exchange business between Great Britain and the Australian colonies and had large deposits. The failure has added to the anxiety and consternation which previous recent failures of financial institutions with Australian connections have caused. Doubtless many miners have suffered from this failure.

GEORGE W. IRVIN, Mineral Land Commissioner from Montana, has returned from Washington to Butte and speaks of the friendly feeling of Hoke Smith, Secretary of the Interior, toward the people of the Northwest in their fight for the preservation of their rights on the mineral land question. Secretary Smith has requested Irvin to prepare an exact statement of the situation for the information of the department, fully explaining the questions involved. Mr. Irvin says he is convinced that the people of Montana and other mining States have a friend in Secretary Smith, and that the valuable mineral lands lying within the sections of the Northern Pacific Railroad will be preserved to the miners of the country.

Two prospectors arrived at Phoenix, A. T., on the 1st with \$700 worth of nuggets found by them in the new diggings, said to be located about thirty miles west of Harqua Hala, in Northern Yuma county, Arizona. The gold is coarse, the smallest particle being worth 70 cents and the largest about \$75. The diggings are supposed to be those discovered about fifteen years ago by the famous King Woolsey, and never since found, though often hunted for. They are in a rich gold-bearing belt.

HON. R. L. THOMAS, the young assemblyman from Nevada county, was banqueted at Nevada City last week on his return home and a very high compliment paid him for his faithful service while at the legislature. The State Miners' Association had already made him a present of a chain and locket as a recognition of his services to the mining community.

CHARLES H. PEARCE, one of Grass Valley's well-known miners, will leave on the 15th inst. for Douglas Island, Alaska, where he will take charge, as foreman, of the Mexican mine for the Treadwell Mining Co. This is the third time Mr. Pearce has been employed by that company.

GEORGE R. WELLS, J. L. FLOOD AND NAT T. MESSER have gone to the Vanderbilt district, in San Bernardino county. These mines are to be listed shortly on the stock board.

Coast Industrial Notes.

THE California Bridge Co. will do the stone and brick work on the new Third Ward Schoolhouse, Oakland.

THE proposition to work the tailings of some of the Tuscarora, Nev., mines by the cyanide process is about to be taken up.

THE State Harbor Commissioners have awarded the contract for the extension of Steuart-street wharf to Healy, Tibbets & Co.

THE matter of giving a \$10,000 bonus to secure a smelter for Tucson, A. T., to parties who contemplate erecting one at Red Rock, is being considered by the Board of Trade of that city.

THE chains used in anchoring the sectional dry docks at Mare Island Navy Yard, have been in the mud for over thirty years, but when hoisted this week appear to be just as good as new.

UNDER the new road law of the State, the Mendocino county Supervisors have let road-building contracts amounting to upward of \$100,000. They will also build a number of bridges.

TWO CARS of the new Alameda electric road have arrived. The trolley wires have been stretched, and all that now remains to be done is some work on the motor and power-houses on Webster street.

FRESNO COUNTY expects during the coming season to ship more than 7000 carloads of produce to market, including green and dried fruits, wine, lumber, wool and grain, to the value of \$12,000,000.

A DEPOSIT of fine building stone of a pale green color has been discovered six miles northeast of Tehachapi. The stone takes on a high polish, and whether polished or in the rough is said to present a beautiful appearance.

THE new boilers have been put on board the Monadnock at Mare Island Navy Yard. The military mast has been stepped. It has two "tops," the lower one of which is reached by an iron ladder leading up through the mast.

WEALTHY LUMBERMEN of Mendocino and Humboldt counties have formed a combination to control the redwood output. These counties furnish most of the redwood of the State, but lately the millmen have been making no money.

COLONEL A. L. CONGER, of Akron, O., a well-known manufacturer, says, after a talk with Secretary Carlisle, that the Administration in revising the tariff law, intends to cut off entirely the duty on tin plate as speedily as possible.

THE Board of Public Works of Oakland has awarded the contract for furnishing stone for the new school buildings to the Farwell Stone Co. Thus, an Alameda stone will be used. The Sites Sandstone Co. bid for this contract but did not obtain it.

THE fisherman on the Columbia are dissatisfied with the prices for salmon. They refuse to deliver for four and a half cents a pound, and a few canneries which pay five cents are getting all the fish. Twelve canneries are getting nothing from the fishermen.

FROM Portland to Spokane, a distance of about 400 miles, an overhead telephone line is to be built, and to this line, two-thirds of which will be owned by the Inland Telegraph and Telephone Company, the Pacific Telephone and Telegraph Company will contribute.

THE steam dredger at work on Lake Merritt has completed filling behind the boulevard wall on the east side of the lake and will move over to the mouth of the main lake sewer in a few days. Preparations for dumping rock on the northern section of the boulevard are progressing rapidly.

THE steel and iron work for the Third street bridge at Napa arrived on Saturday morning from the East. There has been much delay in the manufacture and shipment of this structure and when it did arrive a public demonstration was made by the blowing of whistles and firing of cannon.

IT will cost \$1000 to repair the \$18,000 bridge at Eel river, near Round valley, Mendocino county, displaced by recent high waters. The Doe Hunt Co. of this city built the bridge two years ago, with a \$30,000 indemnity bond with a five years guarantee. The courts will decide the question of responsibility.

RATHER than widen Pine street and maintain lights for the benefit of the city of Oakland, which were two of the conditions required by the Council for an extension of time for completing the Twelfth-street electric road, the owners have concluded to double their force and complete the construction within the limits of the old franchise.

MINE No. 2 at Cle-elum, Wash., has turned out a block of coal 24 feet long, 5 feet 8 inches wide and 4 feet 8 inches high, and which weighs in the neighborhood of 41,000 pounds, or nearly 22 tons. It is encased in planks with heavy iron straps, which it is thought will preserve it intact during transportation to Chicago where it is to be exhibited.

A LINE of OMNIBUSES has been started on the water-front. The route is from the ferries at the foot of Market street along East street and the seawall to Meiggs' wharf, at the foot of Powell street, then along Powell street to Bay street and back along the water-front, striking the seawall at section 2 and continuing along East street to the ferries.

ARTICLES are prepared in San Diego for a new gold mining company, with \$500,000 capital stock, to operate on the unoccupied portion of Csdros island, in Mexican waters, about half way down the Lower California coast. Chicago and San Diego people are interested in it, those from San Diego being Colonel William Denton, James Vernon, H. A. Howard, George Neale, George Foster and George Fuller.

By the terms of the contract for the erection of the great copper smelter at Salt Lake City, the smelter plant and re-

finery shall cost \$500,000; the construction of works shall commence immediately and must be completed and in operation by the 1st of January. The citizens give a bonus of \$100,000 and 160 acres of land to secure this smelting plant for Salt Lake.

The lathers of this city quit work about a week ago because the plasterers refused to grant them an advance in wages from \$1.25 per 1000 laths to \$2.25 per 1000. About 100 lathers are out, and the work on several big contracts has been considerably delayed. At a meeting this week the plasterers passed a resolution declaring that the section of the lathers in asking an advance of \$1 per thousand is uncalled for and not within the ability of the employers to grant.

THE Truckee Republican of April 5th says: The contract for cutting 20,000 narrow-gauge ties was let yesterday by the Pacific Lumber and Wood Company to Frank T. Meloche and Morris Franzini. Work will commence next Monday. This gives immediate employment to a large number of men. The ties must be cut ready for hauling by the first day of June, and will be hauled as rapidly as they are cut. This is the first work done on the new railroad and marks an era in the prosperity of Truckee.

THE San Francisco Supervisors, at their last meeting, passed a resolution putting the electric-light companies on the same plane as the gas and water companies—that is to say, establishing the fact that the city is entitled to a schedule of rates. This measure affects not only the city, but private consumers of electricity. Supervisor Day smiled suggestively when asked what the demand on the electric-light companies meant. "This merely in the same line as the gas or water matter," he said. "We have merely asked them to make a return before May 10th of the data necessary to enable us to arrive at a conclusion as to the proper charges for electric lights. Our right to do this is undoubted."

THE Harbor Commissioners have had under consideration for some time the extending of the belt railroad from Broadway along East street to the foot of Clay. This would complete the line to Meiggs' wharf, as the railroad is already in operation along the seawall from Broadway to Meiggs' wharf. The belt railroad is now in active operation at night for freight cars which are landed at Lombard-street railroad slip by ferry steamers. The road at present is not in operation in the daytime. Chief Engineer Holmes now has in hand an electric storage battery motor for a dummy, and if it is found to be practical and successful the State may operate a passenger line along the water-front from the Market-street ferries to Meiggs' wharf, on the belt-line rails.

THE Pacific Telephone and Telegraph Company has issued notices of intention to issue bonds to the amount of about \$600,000 in June next. This money is to be expended in the construction of a line from this city to Los Angeles, establishing direct communication. Hitbeto Los Angeles has been operated independently as the center of the southern California division. The new line will be from here to San Jose, San Juan, San Luis Obispo, Santa Barbara and Los Angeles, a total distance of 500 miles. The largest poles and very heavy wire are to be used, putting the over-head system on a par with any of the kind in the East and making it as satisfactory as the underground is in its way in the city limits. The wire will weigh 870 pounds to the mile and is to be No. 8 gauge copper. The money is also intended to provide for the completion of the underground system in Los Angeles, and to place all the wires in Oakland underground in the same way that they have been laid in this city.

THE steamship Keweenaw, the third carrier of the North American Navigation Co. to leave this port for Panama and way ports, left on Tuesday. This vessel is the first departure under the Panama contract, and her sailing is the inaugural of the complete service. The vessel carried 315 tons of wool, 65 tons of wine, 200 of flour, 300 of borax, 3 of canned goods, 10 of potatoes and 90,000 feet of lumber. The total tonnage of freight on the Keweenaw is 3360 tons, with the freight at Los Angeles. Total tonnage for the San Juan, of the Pacific Mail Co., which sailed the 5th inst., was 214 tons—a difference of 3146 in favor of the Keweenaw. The estimated value of the Keweenaw's cargo is \$178,055. Same for the San Juan about \$9059.55—this in spite of the reduction in freight made by the Pacific Mail Co. The former rates on wine via the Pacific Mail Co. to New York was 18 cents per gallon; the North American Co.'s rate is 4 cents. The difference of 14 cents represents about three-fifths of the value of the wine.

THE faculty of the Palo Alto University has recently received an addition of two professors, both men of note in the educational world. Amos G. Warner, late of the University of Nebraska, is now at the head of the department of political economy, and Frederick A. C. Perrein is now occupying the chair of electrical engineering.

Now that Comstock men have become interested in the mines at Vanderbilt, San Bernardino county, the richness of the district is recognized, and there is plenty of news published from that region.

It is not known exactly how many miners perished in the Pont-y-Pridd coal mine, Wales, but 53 bodies had been taken out up to Wednesday. The searching parties are still at work.

SUPERINTENDENT THOMAS WEIR, of the Granite Mountain Mine, Montana, has resigned and gone to Seattle to take the management of the Monte Cristo Coal and Iron Co.

THE Osceola gravel mine at Osceola, Nev., turned out a nugget worth \$772 the other day. This claim holds a record of a \$4000 nugget also.

BEN THAYER, recently manager of the Poorman properties, Idaho, has gone to Mexico to take charge of a silver mine.

The Double Standard.

TO THE EDITOR:—If two tide gauges, each of which should be liable to its own independent rising or sinking, should be fastened rigidly together, the result would be a single compound gauge of which the indications would be a compromise between what each would register singly, because neither could rise or sink alone. I think this simile gives a correct idea of what the advocates of the double standard mean, the fastening by which the two gauges are combined representing a parity fixed by legislation; not two standards, but one compound standard.

What is parity? In English, pure and undefiled, it is equality; the word has the same derivation as pair and peer. But in the case considered it means a ratio of unequal weights in which gold and silver are of equal value. But what ratio do writers mean by parity? Some evidently mean that which prevailed from some long past date until 1873; namely, 1 to 16. These men seem to be under the delusion that such ratio is a law of nature; one of them actually wrote of the "natural value" of silver; others, with greater propriety, mean any ratio established by law as a basis for coinage. There is hardly a more fruitful source of disputes than the use of the same term by those who attach different meanings to it.

In a former letter I said, "the price of gold cannot change;" that is, under the gold standard; under a silver standard the price of silver would not change. Under the double standard, gold would have a price in silver coin, silver would have a price in gold coin, and these prices would vary according to the demands of commerce, before which direct legislation would be powerless. As water seeks its level, so do gold and silver seek that equilibrium which depends on the supply and demand for each. They can not be tied together by any law, and a double standard not in accordance with commercial values must prove fallacious.

But, the silver men say, the double standard did maintain the ratio of 1 to 16 up to 1873. I deny this, both on information and on my own knowledge. Between '70 and '73 I was producing fine silver and selling it at a premium of 3 to 4 per cent above "parity," and the silver men themselves say the silver dollar was worth more than its face value when silver was demonetized. If the double standard could not keep silver down to 1 to 16 under an increased stock and supply of gold, how shall it keep silver up to 1 to 16 under a greater increase of silver production?

If the parity ratio should be established at 25 to 1, which is about the present value ratio, or at 20 to 1 in anticipation of a rise, real or relative, in silver, it would not be permanent; either gold or silver would soon be at a premium. I believe the one-sixteenth ratio was introduced by Spain. (I do not vouch for this, for I read but little history, preferring truth.) It endured for a long time with but little disturbance, no doubt, because it agreed nearly with the average supply of the two metals for coinage, a condition which no longer exists, nor can any one ratio be relied on to last for any great length of time.

But the opening of Californian gold fields introduced a disturbing element, and the effect was reinforced by the discovery of Australian gold in large quantity. The tides lag behind the moon; the hottest weather is toward the end of summer, and the full extent and effect of this vast harvest of gold took some years to culminate. Then came the silver from the Comstock, but accompanied by about half as much in gold value; that was not enough of silver to maintain the balance, but silver poured into the market from other sources, and, while it may be that it was demonetized to limit the total amount of coinage, and so check the fall in value (exchangeability) of gold, the effect of which was already felt, and threatened injury to the creditor class, yet the output of silver has increased so largely since that time that the former commercial value of the metal cannot at present be restored by anything short of checking the production, though the relative value (to gold) might be, and probably will be, increased by increased gold production, which may satisfy the silver men.

I think it is much the best to have but one standard metal in which all subsidiary money should be redeemable. Whether that metal should be gold or silver I will not say; either would serve the purpose, though silver is perhaps liable to more rapid and extensive fluctuations of value than gold. Two standard metals will always, in these active times, give trouble and open the way to unjust gains by bankers and brokers, through premiums and discounts. Even if the same single standard cannot be established throughout the world, the inconvenience and loss caused by two standards (for that is what the double standard really is, though not so meant by its advocates) is confined to our foreign trade by our use of a single standard.

With two kinds of legal tender of different commercial values, the one or the other is sure to be the commercial standard for wholesale business, and may be secured by special contract, as was done here when legal-tender greenbacks were worth 35 cents on the dollar in gold. The effect of such a condition of things is that, while many merchants are ruined by unexpected fluctuation, or by the absence of expected fluctuations, consumers suffer because the depreciated money is usually the people's money, and retailers try to fix their prices so as to cover any probable further depreciation between their own purchases and sales. Also, a large number of men find lucrative though socially unproductive occupation in exchanging one kind of money for another. In the times of cheap greenbacks a friend of mine made, or rather gained, for he made nothing, produced nothing, \$25 a day by simply buying and selling paper, gold, and silver money, all legal tender; and he was but one of several hundreds who did likewise in this city. In those troublous times such a state of things was, perhaps, unavoidable, but why should we voluntarily invoke a repetition of such a calamity, even in a lesser degree?

Probably it is not very material whether gold or silver be chosen as the standard. Having decided for the one or the other we shall have done the best in our power so far for, although it will fluctuate in value that is in its ratio of exchangeability for other commodities in general, we cannot find anything which will not do so. C. H. AARON.

India Rubber Trees.

A recent report of the Brazilian Department of Agriculture deplores the rapid destruction of what were at one time looked upon as inexhaustible forests of India rubber trees, and suggests as a remedy that plantations for the cultivation of the tree be established, showing at the same time, by statistics, the enormous profits that would accrue to the planter. In view of the fact that Central and South America, and especially Brazil, are the main territories upon which the commercial world relies for its supply of crude rubber, this official statement from the Brazilian Department of Agriculture becomes worthy of consideration.

The large tracts of rubber forests in the valley of the lower Amazon have been, up to the present time, especially profitable, because they have required the investment of no capital and the employment of but little labor. The swamp land, where the rubber tree thrives, requires no cultivation and demands no care. The tree propagates itself and grows rapidly. All that is required for the collection of a harvest is to send men into the forest to blaze the trees and place receptacles at their base to catch the milk. The causes assigned for the depletion of the forests are the greed of the lessees of the trees and the carelessness of the laborers. No tree should be blazed more than three times in one day, and great care should be taken in this so that the hatchet may not cut through to the trunk itself. If the tree is thus wounded, it slowly withers and dies. If the wood is not touched, however, the blazing of the milk-yielding bark does no harm, and one tree will produce rubber for fully 50 years. If the yield is forced, however, by too frequent demands upon one tree, the crop becomes less every year and in a short time fails utterly.

It is thus evident that an almost inexhaustible supply of rubber may be seriously injured by greedy merchants and their careless employes, for the dealer, as a rule, rents his rubber-yielding land, and cares only for the present return, with no thought of future production. Another source of injury is the poaching by the natives, who wander through the swamps of the upper Amazon, sapping rubber trees for their own benefit and selling their stolen milk to the traders on the coast.

The India rubber plant thrives only in a low and marshy country, and requires a mean atmospheric temperature of 90°. When transplanted to a more temperate climate, the tree ceases to yield milk, and becomes merely an ornamental shrub. In an equatorial climate, however, the plant flourishes, and will make a return in a few weeks for the capital invested in its early planting. The great drawback to planting is that a tree needs a growth of 25 years before it will yield milk. In a virgin rubber swamp, the tree grows among others of different species, so that one man can care for only about 150 trees; whereas, if it were planted in groves by itself, one laborer could attend to several acres, with an average of 540 trees to the acre. It is estimated that 540 wild trees yield 70 pounds of milk per day. This, when dried, gives 35 pounds of crude rubber, which is worth \$15, so that the annual yield per acre, at this rate, would amount to \$2250.

Senor Matias Romero, ex-Minister at Washington, and the Brazilian Department of Agriculture are authorities for the statement that the India rubber tree under cultivation will yield twice what can be gathered from wild trees in the swamps. This statement is based on experiments made on the plantation of Senor Joachim Antonio de Sylva, on the island of Boca Intento in the Amazon river, 12 miles above the city of Para. Here a tract of 40 acres, after 20 years of cultivation, gave a first crop aggregating \$500 per month per acre, or a total of \$20,000 for the first year that the trees were tapped. There was an interval of two months allowed for the trees to rest, so that the year really counted but ten months.

Other experiments in the cultivation of the plant have been made at Soconusco, on the boundary line between Mexico and Guatemala. Young rubber trees were transplanted by the Mexican Government 35 years ago, and they now each yield 50 pounds of milk annually. This amounts to 27,000 pounds of milk to the acre, which reduces itself to 12,000 pounds when dried into crude rubber. The average price of rubber would give a return of \$6000 per acre on this basis, which is double what is realized from the wild trees in the Brazilian swamps.

The official report of the Brazilian Department of Agriculture closes with the assertion that "neither tea, coffee, cocoa, hemp, indigo nor any other agricultural product is as profitable as rubber, the returns from the cultivation of which are almost like those of a mine in bonanza."

The great obstacle which has confronted all those desirous of fostering the cultivation of the rubber tree has been the labor problem. Almost the only human being able to work on the torrid swamp lands of Brazil is the native Indian, and he will only work a few days of the year, just enough to accumulate the few dollars necessary to sustain him. The heat and malaria kill off any white man, whether native born or immigrant, who attempts to work in the swamps, and the traders are therefore compelled to rely on the natives. The Indians know this, and for the most part go into the swamp on their own account, rob the trees of their milk, and sell it to the merchants. The Brazilian Congress has tried every means of preventing these marauders from invading the swamps, but as yet has been unable to frame any remedy.

Perhaps an easier way to establish a plantation would be to purchase a tract of virgin forest in the Amazon valley, to clear away the old trees and those of other species, and then to care for the grown rubber trees already there. Such a proceeding would take about five years only, but would cost fully four times as much as the first plan. The cost of the swamp land would be small, but an acre of wild forest would produce only one-fifth as much as an equal area under cultivation. But even \$100 net profit would make fair interest on the investment. In either of these cases certain stringent laws would have to be passed and enforced to prevent marauding natives from killing the cultivated trees in their thieving invasions.—New York Sun.

The Yukon River Region.

Capt. Wm. Munre, a pioneer of the mining camps of British Columbia and Alaska, expresses himself as follows in the *Victoria Colonist* relative to the Yukon section:

The Yukon district is a grand country for the miner and prospector, and there is an easy and feasible way of bringing it within eight or ten days' journey from Victoria, which will do away with the present serious difficulties that exist and will relieve miners going into that country of nine-tenths of their present hardships.

THE ST. MICHAELS' ROUTE.

First, the long and circuitous route by the way of St. Michaels must be done away with, as you will perceive by following that route from Victoria to the mines, how many dangers and difficulties the miners have to contend with by going that way.

The distance from Victoria by way of the mouth of the Yukon up to Pelly river is, roughly estimated, about 4500 miles, and goods and provisions going that way have to be landed on the barren island of St. Michaels, where there is neither wood nor water, and an ocean vessel has to anchor between three or four miles off shore, and, with heavy westerly winds she has to heave her anchor and stand off to sea. The ocean steamers cannot go to St. Michaels before the latter end of June or the first of July on account of the pack ice in that part of Bering sea and Norton sound. At St. Michaels the freights are transferred to river steamers and the route between there and Offen mouth, which is the northern passage of the Yukon, is exposed to the open sea with strong westerly winds, which makes it very dangerous for such vessels. This was where the Alaska Fur Co.'s steamer Arctic was wrecked in 1889, which jeopardized the lives of about 250 miners who had waited at Forty Mile creek and its vicinity for her arrival with the year's supplies.

The first consignment of provisions that the miners get are a year old, being that length of time on the journey, for they are first taken only 300 miles up the river and here the steamers go into winter quarters, and they do not continue their journey until after the breaking up of the ice, which is generally about the 26th of the following May. You can form some idea of the state the bacon and other provisions are in when the miners get them.

As yet there are

ONLY TWO STORES,

One being at the mouth of Pelly river and the other at the mouth of Forty Mile creek. The extensive territory at the mouths of Pelly, Lewes, Salmon and Hoodalinka rivers and Testle lake, and the river that empties into that lake and which drains the whole of the western slope of the Cassiar district, and where large deposits of gold are known to exist, has not been prospected only by but a very few miners, on account of their not being able to procure supplies.

It is, therefore, most desirable that something be done to render the district more easy of access, for these miners and prospectors, as, with such a vast extent of country unexplored between the Lewes river and Cassiar district—over 60,000 square miles of which is virtually a terra incognita except for prospectors and miners, lying partly in British Columbia, known to be rich in gold—it is not improbable that further rich discoveries than those already made will take place and a period of activity in placer mining set in in which "ready bullion" results greater than ever known before and a revival in the prosperous times of the good old days of Cariboo and Cassiar possibly on a 10-fold larger scale.

If this portion of Canadian territory lying close to the coast had a trail or wagon road such as I have been advocating during the past five or six years, there would be thousands of miners in that section of the country, for as it is, a number of men could not be supplied for any length of time unless there was a road made on which the miners could travel at all seasons of the year and by which storekeepers could get their stock of goods replenished at any time. Listen to what some of our eminent explorers and miners have to say about this country.

Look! says Mr. Moore, look at the consequences to the miners and country attendant upon any mishap to the steamers that supply food to the vast country. Allow me to carry you back a few years to an incident that happened. At the approach of winter in 1880, 200 men at Forty Mile creek were anxiously awaiting the supply steamer, long overdue. Flour could not be obtained in camp for its weight in gold, and bacon and beans were luxuries of bygone days. A crisis in their affairs was fast approaching, when Indian runners arrived with the startling information that the steamer was wrecked not far from the mouth of the river and no grub could come to them that winter. Work stopped then and there and an exodus to the coast began. It was stay and starve or reach the wrecked steamer and live. After a journey of 800 miles, involving incalculable suffering, Nuklukahyet, a trading post of the Tananah Indians, was reached and it was found that the steamer had been patched up and that it had arrived at that place. The supplies were in a terrible condition. The flour, which had soaked in the water, hardened and had to be beaten with clubs and put through sieves, and then was streaked with green mould, while the bacon resembled blubber. About 90 of the party took possession of the steamer New Racket, which was lying at Nuklukahyet and started for St. Michaels.

At Nulato the ice cut through the steamer, rendering her useless, so the remainder of the trip was accomplished by land, through snow and slush for 250 miles, until Norton sound was reached, about 70 miles north of St. Michaels.

You will see by the above how necessary it is that these people should have other ways of ingress and egress. They ought to have a route from the coast that would be easy to follow. All these conditions a good trail, suitable for pack trains to the Yukon river, will provide. Now, men leave Juneau in February and March to reach Forty Mile creek in June; and, going out, leave the creek late in August or

the first of September, losing several weeks of good working time—a serious loss when that working time is so short—to start for the coast.

Upon this interesting subject numerous explorers and prospectors have reported, among whom I may mention the following:

Mr. Ogilvie says: "Cassiar Bar was worked in the season of 1886 by a party of four who took not \$6000 in 30 days. They were working there when I passed in 1887, but stated all they could get that season was about \$10 per day to the hand.

"Stewart river was the first in the district on which mining to any extent was done. In 1886 there was quite a number of miners on it engaged in washing gold, and they all appear to have done fairly well. I have heard the amount of gold taken from Stewart river in 1885-86 estimated at various amounts, one being \$300,000.

"The highest amount I heard of as representing any one man's earnings was about \$6000. Many agree that \$30 per day was common on many of the bars on the river, and instances of as high as \$100 per day have been earned.

"In conversation with Mr. T. Binswell, who had prospected the Teslin, Hoodalinka or Newberry river, in the summer of 1887, I learned that the whole length of that river yielded fine gold, generally at the rate of \$8 to \$10 per day; but as the miner's great desideratum is coarse gold, they did not remain long in a country in which fine gold only is found.

"It is probable that we have not less than 1400 miles of stream in out part of the district, upon all of which gold can be found. I think it may with confidence be asserted that rich finds will yet be made of both coarse gold and gold-bearing quartz."

Dr. G. M. Dawson, of whom perhaps there is no better authority on the continent, says in an excellent and extended report on the subject:

"Without including the northern part of British Columbia, but restricting ourselves more to the great area of 192,000 square miles, situate to the north of the 60th parallel and west of the Rocky mountains, which I refer to as the Yukon district, it may be said that the information now obtained is sufficient to warrant a confident belief in its great value. Very much yet remains to be learned respecting it, but it is known to be rich in furs, well supplied with timber, and is traversed by a great length of navigable rivers. It is already yielding a considerable yearly gold product, and presents every indication of a country rich in other metals and including vast deposits of coal and copper.

In the northern portion situated between the 60th and 65th degrees of latitude is comprised an area of not less, probably, than 30,000 square miles, in the future suitable for an agricultural population, and presenting none of the characteristics of a sub Arctic region, which have, in advance of exploration, been attributed to it by some writers. The winter climate of this whole great region is known to be severe. Mining can scarcely be said to have begun in this region more than five years ago, and the extent of country over which gold has been found is very great. Most of the prospecting has been confined to the banks and bars of large rivers, and it is only when their innumerable tributary streams begin to be closely searched that gulch diggings, like those of Dease, McDane's and other streams in the Cassiar district—and possibly even on a par with Williams and Lightning creeks in Cariboo—will be found and worked. The general results so far have been to prove that six large and long rivers—the Lewis, the Testle, Big Salmon, Pelly, Stewart and White—yield fine gold along hundreds of miles of their lower courses. With the exception of the Lewis, no part of the headwaters of any of these have as yet been prospected, or even reached by the miners, and scarcely any of their innumerable tributaries have been examined. The developments made at this time are sufficient to show that when means of access are improved important bar mining will take place along these rivers. Quartz mining will undoubtedly follow, and the prospects for the utilization of this great mining region in the near future appear to be very promising.

Washington's Lumber Interests.

Census Bulletin No. 364 is devoted to the lumber and sawmills of California, Oregon and Washington. The first item of interest is the percentage of increase in the decade 1880-1890. For Washington this increase is \$1554.94 in aggregate wages paid; 1253.31 in number of hands employed; \$568.22 in value of classified mill products. These percentages are three times as large as those of Oregon or California.

In Washington in 1890 there were 311 establishments reporting, as compared with 37 in 1880. Capital invested, 1890, \$19,307,829; 1880, \$2,456,450. Hands employed, 1890, 6753; 1880, 499. Wages paid, 1890, \$3,318,796; 1880, \$200,539. Material used, 1890 (cost at mill), \$7,272,269; 1880, \$1,188,075. Product in 1000 feet sawed lumber, board measure, 1890, 981,004; 1880, 160,176. Shingles (1000), 1890, 545,297; 1880, 3610. Total mill products (value), 1890, \$13,898,504.

Doubtless it will surprise many people to be told that the value of the Washington mill product in 1890 exceeded that of Oregon and California combined. The figures were: Washington, \$13,898,504; California and Oregon, \$13,601,477; or nearly \$300,000 more. Washington also paid in wages more than Oregon and California combined, the figures being: Washington, \$3,318,796; Oregon and California, \$3,243,213.

The capital invested in Washington lumber and sawmills was \$19,307,829. This was nearly nine times as much as in 1880 and nearly equals that of Oregon and California in 1890. The greatest increase in product, of course, was in shingles. In 1880, 3,610,000 shingles were produced in Washington. In 1890, 545,297 were made, and the product of shingles in 1890 was slight compared with what it is to-day.

The contents of the whole census bulletin will be found

interesting by all who are concerned in lumber, but the most important facts are those cited above. They show conclusively not only how vast are Washington lumber interests, but that they are of vital concern to the State. Few persons not familiar already with the facts would be likely to believe that Washington alone is so far ahead of its sister States on the Pacific Coast, especially when the many uses and high prices of the California redwood are considered.

The Kootenai Country.

John Wagner of Phillipsburg, Montana, who has been some months in British Columbia, in an interview in the *Mail* says the Kootenai country has been known for many years to hunters and trappers to be a mineral-bearing one. Placer mining has been carried on for years in a crude way, and handsome returns have been gained. It was not till August, 1892, that any quartz locations were made as far as known. At that time J. W. Haskins of Revelstoke discovered what is known as the Haskins group, near the headwaters of Healey creek, on the divide between the Lardo and Duncan rivers. On account of this discovery, the Provincial Government in 1891 constructed a pack trail up the Lardo to Trout lake. The excitement occasioned by the rich strikes in Slokan district naturally drew the prospecting element toward that section during the past year, and as the district was swarming with men the past summer, a number pushed forward in a northerly direction to trace the mineral belt, which finally brought them to the Lardo-Duncan country.

On Davies creek, which empties into Kootenai lake at the new town of Lardo, large bodies of copper ore have been discovered. On Cooper creek, which empties into the Lardo a short distance above its mouth, some 50 or 60 locations were made showing ore of a high grade. The Haskins group, mentioned above, includes the Abbott, King William, Union and Stella. Assays from the surface of these claims gave from \$7 to \$20 in gold, 120 to 160 ounces in silver and a high percentage of lead per ton. Near this is the Kennedy-Wagner group, from which assays have been obtained giving from \$10 to \$30 in gold and 115 to 552 ounces in silver. About five miles to the southwest is the Orphan Boy, with an ore-body from 15 to 24 inches wide, solid galena, carrying from 90 to 120 ounces silver. The Maple Leaf carries ore assaying as high as \$200 to \$240 per ton in gold; while in the same group are the Crown Point and Beaver, similar to the Maple Leaf, and from which assays of 80 ounces in silver with high grade of lead have been obtained.

Two miles north, says the *Nelson Tribune*, and on the same belt, is the North Star group, owned by Abrahamson & Langrell. They have one vein from 15 to 20 feet wide; average assay, \$53 gold and 25 ounces silver. One mile to the east is the Silver Cup group. Here is located the Crystal, containing four feet of solid ore; value, \$23 gold and 94 ounces silver. The Queen of the Hills and Silver Cup average about the same; namely, 22 inches solid ore, from which specimens taken have yielded from 653 to 2300 ounces silver per ton.

The Leroy & Gainer group is situated on Lime creek, a tributary of the Lardo. The veins are from three to five feet wide, from which assays have been had yielding \$15 to \$20 gold and 200 to 400 ounces silver. The Poole & Crockett group is situated between the north and south forks of the Lardo river. Here, it is claimed, a ledge exists fully 80 feet wide, carrying galena and carbonates. A crosscut exposes 13 feet solid galena, assaying \$49 gold, 53 ounces silver, besides quite a quantity of lead. The carbonates in this vein assay as high as 300 ounces.

In the same vicinity is the Great Northern group, located by Downs, Holden, Walker and others. It is estimated there are 1500 tons of ore, running from \$8 to \$15 gold and from 40 to 63 ounces in silver, with a fair percentage of lead in sight on the Great Northern, and the claim has been bonded to John A. Rockefeller, the Standard Oil millionaire.

Two miles easterly from the Great Northern, on the low, grassy divide between the Lardo and Duncan rivers, are the claims of Messrs. Horne, Nagle, McDonald and Edwards. Several other persons, also, have locations in this neighborhood. The principal claims comprise the Horn Silver, King, Celtic, Canadian Girl and Iron Horse. Two strong parallel ledges exist here, one from three to four feet in width, filled with rusty galena and carbonates; average samples yielded from \$13 to \$23 in gold and 53 ounces silver, besides the lead contents. The other ledge is a contact between black slate and lime, and is from 30 to 40 feet wide, the vein matter of which is granulated quartz of a friable nature, carrying bright, hard galena and free gold. This quartz has been crushed and tested by panning—from 500 to 600 colors of gold have been found in one pan of pulp. Very conservative prospectors predict that this ledge will be the Comstock of the Lardo-Duncan camp. Eleven claims, all showing ore, have been staked on this vein.

About one mile easterly from the locations above described, near Duncan river, on the same grass-covered mountain, lies the Blackburn group. Mr. Blackburn, who is a mining engineer, with his partners, have six claims located on a ledge from five to six feet in width, carrying an ore body from two to four feet thick, assaying \$47 in gold, 90 ounces silver and rich in lead contents.

A deal of considerable magnitude would have been consummated on this ground the past fall had the depth of snow not prevented the representative of capital from reaching the claims.

Two miles westerly from the Horne camp is a group of eight claims, owned by Messrs. Livingstone, Raimey and others. The ore is similar in character to that of the Blackburn cluster. The Montgomery and Brett group is located ten miles northerly from the mouth of the Lardo river, on Glacier creek. The claims are five in number and contain large bodies of rebellious gold ores, which an

analysis proves can be successfully reduced by the MacArthur Forrest process.

Grey's galena camp is situated a short distance above, on Duncan river.

Here several claims have been secured which have similar characteristics to those above described. About six miles above the Grey camp, Messrs. Cudihee & Grey have several promising free-milling gold claims.

In this vicinity, on Eight Mile creek, is where Mr. Hirsch and companions of the provincial government surveys, found the rich gold float that caused some excitement last fall, and where they have two locations on the source of the float. Mr. Hirsch, also, has several locations of rich hydraulic diggings near by, containing coarse gold. Across the valley from the Hirsch quartz locations are the discoveries of Messrs. Reno, Sandoz and Cudihee, made late last fall. Ore brought back by them and assayed gave returns as high as \$2200 per ton in gold.

The foregoing comprises about all the information obtainable concerning the coming scene of great mining activity. It will be seen that the majority of the finds described carry auriferous as well as argentiferous galena, and that gold, quartz and placer mines will doubtless yet be a factor in the Lardo-Duncan country.

The Lardo and the Duncan rivers are only navigable for the smallest boats; but two lakes exist. Trout lake, on the Lardo, 30 miles from the north end of Kootenai lake, is 15 miles long and from one to one and a half miles wide, while Upper Kootenai lake, on Duncan river, five miles above its junction with the Lardo, is 12 miles long and from one to two miles wide.

The question now is—and it is one worthy of consideration by the business men and transportation lines on Kootenai lake—can the ore from the claims in the Lardo-Duncan country be brought down the Lardo river, thence to market by Kootenai lake, or will it go north and west and out by the northeast arm of Arrow lake and the Columbia river?

Shasta County Coal.

In speaking of our numerous resources and products, says the *Redding Free Press*, the coal deposits of Shasta county have always been noticed, but probably there are not a dozen of our inhabitants who really know the magnitude of the deposits, the quality of the coal, or who can give special or detailed information on the subject of Shasta county coal. This week we have been able to glean information from a reliable source on the subject, and will attempt in this article to give what we have learned to the public, that our readers may not only become posted but also that they may realize what the future has in store for us:

A gentleman, whose name we are not at present at liberty to use, but who, suffice it to say, is posted on the subject of coal, has made a report on the deposits long known to have existed in the vicinity of Round Mountain and on the line of the Shasta railroad. From his report we learn that the coal area is from 30 to 70 miles long and 18 miles wide, commencing at Township 31 north, Range 2 west, and running to Townships 35 and 36 north, Ranges 2 east, and taking in all of Township 35 and 36 west. Most of the explorations have been done in Township 33 one east, 34 one east and 34 one west. In Township 33 one east, Section 22, a tunnel has been made 85 feet long, which is 7x8 in the clear and all in coal. At the end of this tunnel a shaft has been sunk 100 feet, cutting through 32 feet of coal matter. The coal veins are devoid of clay or rock seams, but the seams are bituminous shale, one strata being 22 inches thick. The veins lay at an angle of two degrees, pitching south. It is estimated that at a depth of 2000 feet that the pressure will be 1000 feet.

On the other townships, between 20 and 30, different shafts and tunnels have been opened, cutting 12 different veins, the last vein cut showing four feet of coal. This vein is 150 feet below the level of the tunnel spoken of above. The largest vein cut was 22 feet. There is plenty of timber for mining, and by an incline plane the coal can be run to a railroad, in fact a railroad can be run over the land, although its altitude is from 1800 to 2000 feet. It is estimated that coal can be mined and put on the dump at a cost of 25 cents per ton. It can be mined cheaper than Wellington coal, as there is not so much waste, and can be gotten out in lumps with very little screenings. Of course this favors cheap mining. The character of the coal is lignite or semi-bituminous, and is estimated ten per cent better than any coal found in California and equal to Washington or British Columbia coal. The greater the depth the better the coal. It is estimated that this coal can be mined 20 per cent less than Seattle coal. As it lies horizontally, it shows evidence of a continuous body that will not pinch out. It is of high commercial value. It contains a trace of sulphur and is from one to ten per cent less in moisture than Wellington coal and more volatile than Seattle coal.

The expert, in his concluding remarks, says that all coal west of the Rocky mountains is lignite, and that this is of the best quality of lignite; that the seams are bituminous shale, and that deeper down it becomes more bituminous and that he considers it the best coal in California.

Besides coal, he found magnetic and hematite iron ore, granite, lime, dhalomite, blue and gray building sandstone, marble and valuable pottery clay, and it is the opinion that, with iron and coal in abundance, it will only be a question of time when steel will be manufactured in this vicinity.

The extension of the Shasta railroad will open up all these resources, and as the road continues northward it will also open up a fine body of timber—yellow and sugar pine, fir, spruce and cedar—as also tamarack groves, from the fiber of the trees of which the finest paper pulp is made. Then on to Stone Coal valley, in Modoc county, where there is another fine coal deposit, the road is sure to open up a most valuable territory.

Niagara in Harness.

No engineer ever looked at the spectacle of power displayed by Niagara falls without a feeling that it was a crime to allow the enormous energy there stored up to run to waste from eternity to eternity. The artist is content to steep his soul in the beauty of the scene, but the average utilitarian American is likely to do some figuring on horse-power and available units of work. The prophecies of years are about to materialize in a great power plant, which will utilize 100,000 of the 15,000,000 of horse-power going to waste over the falls, and \$2,500,000 has been expended and the water-wheels will be in place and the sluices will be opened.

From the early years of the ownership of the falls by the Porter family, the advantages of the great water-power were freely discussed, but nothing was done until about 1850, when Horace A. Dey caused the construction of a canal, which takes water from a point above the rapids and conducts it to a set of mills built on the banks below the falls, and now known as Schoellkopf's mills. The Niagara river makes a bend at a right angle, and the falls are at the apex of that angle. This canal forms the hypotenuse of a right-angled triangle, of which the longest side is the river above and the shortest side the river below the falls. The mills are near the falls, and are not a picturesque feature of the scenery.

The turbines which drive the mills are sunk in pits only about 50 or 60 feet deep, and consequently their tall faces discharge a hundred feet or more above the surface of the rapids below the falls, and half of the available power of the water brought down by the canal is thus wasted. Less than 6000 horse-power is utilized.

The new works have reversed this plan of a long supply canal and a short tail-race. They have been constructed on a modification of a plan first proposed by Thomas Duersted, a division engineer of the New York State canals. The plan is to have the mills on the banks above the falls, and at a distance from the scenic locality, and then to have a long tunnel to carry the waste water down the rapids.

The mouth of the canal is more than a mile above the falls. As far as constructed the canal is about 1500 feet long, 12 feet deep, and varies from a breadth of 200 feet at the mouth to 100 feet at the inner end. Along the sides of this canal and of its branches are to be built or sunk pits to a depth of 160 feet, and at the bottom of these pits are placed the turbine water-wheels. Each of these wheels has 140 feet effective head of water over it. The water is carried down to them in great pipes, seven or eight feet in diameter, called penstocks. After the water had done its work on the wheels it was discharged into the big tunnel, which runs away underground to the river below the falls. This tunnel has been the most difficult and costly part of the work so far. It was cut through solid limestone rock, but the rock was found to crumble so badly after exposure that the whole 7000 feet of the tunnel had to be bricked up. It is in the form of a horseshoe, 28 feet high and 18 feet broad, inside dimensions. Starting at a depth of 160 feet, it has a downward slope or pitch of four feet in a thousand at first, increasing to seven feet in a thousand. Its mouth, where it discharges into the rapids, is 214 feet below the brink of the cliffs which form the ravine. Its cross-section is 375 square feet, and at the speed of 20 feet a second, with which the water will rush out of it, there will be a discharge of about 50,000 gallons per minute.

And yet this enormous amount of water will not show any appreciable drain whatever on the magnificent volume of Niagara. It will lower the level of the great flood only about one and a half inches. The extent and constancy of this water-power can be understood when it is realized that the water service of the great lakes, with the land sloping into them and contributing to the falls of Niagara, has a total drain basin of over 240,000 square miles—equal to more than twice the area of Great Britain and Ireland, about 40,000 square miles more than the total area of France, and more than 15 times the total area of Switzerland. The Horseshoe falls are 158 feet high and 2000 feet wide. The other chaeon, in the State of New York, forms the American falls, which are 169 feet high at the eastern side, and 1000 feet wide, both falls comprising 3600 linear feet of water.

The extreme limits of variation in the depths of the river at different times above the falls are 3½ feet, but these limits are rarely reached. The ordinary variation is about one foot. Below the falls the extreme variation reaches about 15 feet. Generally a variation of one foot above the falls is followed by a change of level of five feet below the falls. These slight changes are of short duration, and are due mainly to long-continued or violent wind, or sudden great accumulation of ice.

The average discharge of water at the outlet of Lake Erie into the Niagara river is estimated by some authorities at 265,000 cubic feet a second. Moreover, as far as this or the next two generations are concerned, it doesn't matter whether there is any rainfall, for there are 6000 cubic miles of water backed up in the little mill-pond of the Niagara Falls Power Company, which is sufficient to run the falls in the present style for 100 years without the help of another drop from the clouds.—New York Tribune.

THE GEOLOGICAL SURVEY.—Willard D. Johnson, who is in charge of the California and Nevada division of topography of the United States Geological Survey, and R. B. Marshall, one of the surveyors, have left for Washington, D. C., under orders that are at present secret. All field parties connected with this division will be called in on or before the 15th inst., and they will be placed at work in the office. These parties have been out since June 1, 1892, collecting information for maps of this division.

A MENDOCINO BIG TREE.—Mendocino county will have a section of one of its giant redwoods at the World's Fair. G. W. Stevenson of Westport has gone to Chicago for the purpose of superintending the location of this monster trunk. The portion of the tree to be exhibited measures

12 feet in height and 77 in circumference. It was cut on Eel river. It took two of the largest saws brazed together to fell this enormous redwood, and the time required was seven days. It measured 427 feet in length and is the largest redwood ever known. Where it broke, 274 feet from the stump, it was nine feet in diameter. It will be cut into ten slabs for the purpose of transportation. With the exception of a few specimens of the sequoia gigantea, with which the redwoods have been frequently confounded, this is undoubtedly the largest tree in the world.

Platinum Ore in New South Wales.

The first discovery of platinum in New South Wales, says *Iron*, was made near Mulga Springs in some cupriferous ironstone which was being worked for copper. A report recently supplied to the Minister of Mines by Mr. J. H. Jaquet, geological surveyor, states: "I have visited the various deposits of platinum which occur in the neighborhood of Broken Hill. During the year 1889 Mr. T. B. Belgrave, M. D., of Broken Hill, sent some samples of ore obtained from the parish of Tara to the Mines Department, in order that they might be assayed by Mr. J. C. H. Mingaye, F. B. S., etc. While engaged in assaying the ore, certain unusual reactions were observed, which caused Mr. Mingaye to suspect the presence of platinum, and he accordingly made a careful examination for this metal, but found that the quantity present in the samples was too small to afford a profit after extraction.

"I have no doubt that ore carrying a small quantity of platinum could be obtained over a very wide area of the 'Barrier' district, but hitherto prospecting for this metal has been confined to two localities. Scattered over the country are superficial masses of ironstone, generally more or less impregnated with carbonate of copper, but sometimes free from this substance. It is in these deposits of ironstone, and the more or less decomposed rock underneath them, that the platinum occurs. All the superficial deposits of ironstone do not contain platinum, and no difference can be detected in the appearance of those ironstones in which this metal is present and those in which it is absent. Occasionally the ironstone is seen cropping up at the surface, but it is generally covered by shallow pleistocene and recent deposits, and trenching is necessary to cover it. The ironstone cap passes by insensible gradations into ferruginous clays below, and these clays into granules of silica, cemented together with kaolin or into a compact kaolin. It would appear from the assays that the clays and kaolin contain a larger amount of platinum than the ironstone. On the Broken Hill Proprietary Platinum Company's property some very large masses of copper-stained ironstone, which carries platinum, are to be seen. Very little work has been done to prove these deposits, and hence I am unable to give an exact account of their dimensions, etc. A specimen of ironstone, which I selected at random, yielded on assay by Mr. Mingaye: platinum, 5 dwt.; silver, 1 oz., 16 dwt. per ton, and a trace of gold. Some ironstone obtained from the parish of Sebastopol, where it occurs as a contact deposit between serpentine and gneiss, I was told had been found to contain platinum, but the samples which I took from this deposit yielded no platinum when assayed by Mr. Mingaye. I also took samples from other reported finds of platinum ore, but in no instance, other than those mentioned, was this metal found to be present. Two attempts at concentrating this ore were made under the direction of the Department at the Clyde Works, and the results obtained were very discouraging.

"The platinum deposits in the Broken Hill district differ from any previously discovered. Owing to this circumstance and certain general peculiarities in the mode of occurrence of platinum and its allied metals they possess a considerable amount of scientific interest. All commercial platinum has hitherto been obtained from alluvial deposits, where it occurs in the form of small but well-defined grains scattered through gravels, etc., over wide areas. In no respects do the Broken Hill deposits resemble these alluvial ones. Authentic instances of platinum occurring in lodes are rare. Mr. J. A. Philips mentions 'that small grains of platinum are said to have been occasionally observed in the auriferous quartz of the Beresovsk mines.' Messrs. F. W. Clarke and C. Catlett reported in 1889 'that they had found as much as 2.55 ounces of platinum per ton in some samples of nickel ore obtained from the Sudbury Mines in Ontario, Canada.'

"In the case of the Broken Hill deposits, when the copper-stained ironstone cap and the clays immediately below it are penetrated, no traces of copper pyrites or other iron and copper ores are to be seen, and so the cap is not a gossan representing the oxidized portion of ore beneath. The iron, copper, platinum and small quantities of other metals found in these deposits were probably originally carried by these springs in solution. The iron and copper were precipitated from these springs when they reached the surface, and were brought under the oxidizing influence of the atmosphere, but the platinum seems to have been partially absorbed by the kaolin, and only a portion reached the surface."

The government geologist appends the following minute: "Mr. Jaquet's report is interesting from a scientific point of view, inasmuch as the platinum deposits which it describes differ in their mode of occurrence from any hitherto known. He is of opinion that the masses of platiniferous ironstone (chiefly copper-stained) owe their origin to springs, which carried the iron, copper and platinum in solution, and deposited them on the surface. These masses of ironstone appear to have no connection with lodes, but occur capping intrusive and sedimentary rocks alike. None of the deposits have been prospected to any great depth, and in none of the samples assayed was platinum found in sufficient quantity to pay for extraction. I observe that since the date of Mr. Jaquet's report the value of platinum has declined very considerably, so that unless very much richer ores than any of those hitherto met with be discovered, it is not likely that platinum mining will become one of the industries of the Barrier."

Electricity.

Commercial Value of Electricity.

Although electricity has a commercial value next to steam power, and has been successfully applied to such a multitude of uses, one may often hear the remark that electricity is in its infancy. One would not like to think of it as in its dotage, but certainly one might think it had attained to vigorous youth, and that its swaddling clothes were quite outgrown. If by the expression is simply meant that the possibilities of the employment of electricity have not yet reached their limit, it is true in one sense, but far from being true in another sense. Prof. E. A. Dolbear, in *Donohoe's Magazine*, says: There appears to be a vague notion in the minds of some persons that electrical energy is illimitable, so that with machines more perfectly adapted to electrical laws more and more work can be done by a given amount of electrical energy. One may sometimes hear of an enthusiastic inventor who claims to have devised a dynamo or a motor two or three times as efficient as any other, or a galvanic battery which can take the place of a dynamo for extensive electrical work. It is to be remembered that in order to obtain electricity for any purpose whatever some kind of power must be provided to produce it. Steam, wind, water or chemical action are antecedents. If a steam engine of 50-horse power is made to drive a dynamo, no more than 50-horse power can possibly be got out of the electrical current the dynamo generates; indeed, not so much as that, on account of the mechanical losses unavoidable in all machines. But the dynamo of to-day is one of the most perfect and efficient machines the art of man has yet produced. It will return as much as 95 per cent of the power applied to it, which shows that no considerable improvement in its efficiency is possible. This is true also of motors and of so-called transformers, so one must not think of dynamos and motors as being in their infancy. They are full grown, and either may be designed to do any amount of work with greater accuracy than is possible with a steam engine for the same service. If it were true that more work could be got out of an electric machine than is turned into it by an engine, then perpetual motion would at once be attained. If 10-horse power of steam would produce 11-horse power of electricity, the dynamo could run itself and have one-horse power to spare.

One may depend upon it, no one will hereafter make dynamos more efficient than they can be made to-day, though doubtless machines may be made smaller and lighter, capable of doing the same amount of work. There is a doctrine in physical science known as conservation of energy, which is so fundamental, and is so well established, that every scientific man lets it dominate in his reasonings, and does not entertain for an instant any idea which implies its denial. For such reasons he believes that this part of electrical science is not in its infancy.

Again there is also prevalent an idea that the knowledge of electrical phenomena, and their laws possessed by electricians to-day, is so far from completeness that one may look any day for an announcement of some newly discovered laws that will practically abrogate most which we now think is well established. It may seem incredible, but this is nevertheless true, that there is not a single electrical action now in such common use but has been known for a generation or more. Arc lights have been known for 80 years. Incandescent lamps for 30 years. Electric motors drove machinery 60 years ago. An electric locomotive was made 40 years ago. The telephone was used 30 years ago. The patent was held on a legal technicality, not for intrinsic novelty.

There are plenty of electrical phenomena well known which are lying fallow. The illustrious Faraday made many electrical discoveries. One of them was a mechanical origin of electrical currents which has issued in the modern dynamo. Another was the action of magnetism upon light, and this has no commercial value at all, as it has not been made to serve any economic purpose. The known mathematical relations of electrical phenomena make it very certain that in this direction nothing can come to materially modify present knowledge. This, in many ways, is as complete as the astronomical knowledge that enables one to compute the time of the next transit of Venus.

These stated limits do not in the least imply that there is little or nothing more to be expected in the future in the development of electrical industries. Indeed, it is certain that both improved methods and new uses for electricity will appear, and some of these are now very near. The man in the rigging

can often see the hull of a vessel which is below the horizon to the man on deck, and there are several electrical crafts now visible from such an elevation. To describe such minutely is not, of course, possible; but the main features are discerned without difficulty.

The Progress of Electric Traction.

The *Engineering News* has recently published an interesting table of statistics concerning the street railroads in the United States. From it we learn that at the close of 1892 there were 5939 miles of electric railroad, 4460 miles of horse railroad, and 646 miles of cable. This is an increase of 1878 in electric mileage, 52 in cable mileage, and a decrease of 842 in horse mileage. The horse cars numbered 19,315, a decrease of 2483; the electric cars numbered 13,415, an increase of 4523. In the six New England States the electric mileage surpassed the horse roads, and the same result is found in the five North Central States, the six South Atlantic States, the six Northwestern States, and the five Pacific States. The horse-car mileage is still in the lead in six Middle States, the five South Central States, and the five Southwestern States, but it is altogether probable that in another year electric cars will lead in these States also. The total number of street cars in use is 38,400. In addition to the horse, cable and electric cars, steam dummies are used on some roads, and there are a few other systems, such as ammonia, naphtha, compressed air, etc., which severally are so small as to be insignificant.

The principal fact to be noted is the enormous increase in electric mileage and cars, and the proportionate decrease in horse cars and mileage. The electric cars already number over one-third of the total, and the horse cars have fallen to about one-half of the total. The total mileage of all street railways, including steam dummies and other systems, is 11,665, and the electric mileage is already more than half, the horse mileage less than one-half, and the cable, steam, etc., a little more than one-tenth. Four years ago there were no electric railroads to speak of. To-day, owing to the senseless, prejudiced or ignorant opposition of the daily papers, New York City is about the only large city in the United States where this form of street car propulsion is not making rapid strides to the leading place.

The reason why the electric cars do not increase in the same proportion as the mileage may be found in the fact that the cars are larger and carry more passengers, and also in the fact that the electric roads are in many cases interurban, affording a means of intercommunication among villages and country towns, which horse cars were unable to supply. The greater speed, too, of the electric cars, makes fewer of them necessary to accommodate the traffic.

At this rate of progress it will be only a few years when the last horse car will have disappeared.

Commercial Phosphorescent Lights.

We are pleased to see that the long-prophesized and much-talked-of "cold light" which is to revolutionize modern lighting appears now to have been promoted from the rank of a laboratory apparatus to that of a lamp for commercial lighting. An enterprising firm in England is making a good beginning by introducing commercial lamps in which the light is produced by high-tension discharges in phosphorescent vacuum tubes. Although, as with most inventions of a radically new type, there are still very serious objections to it, yet these are being overcome, one by one, and it is not unlikely that this beginning will encourage others to take up the field. The subject is of special interest just now, owing to the unsatisfactory state of the incandescent lamp question. As there are no fundamental patents to hinder the developing of such lamps, inventors need not fear being handicapped by some future legal decision. Attention might here be called to the recent paper of Dr. Sumner on diffusion of light, from which it will be seen that an effective illumination does not depend alone on the brightness of the lamps, but that if the light is diffused a much smaller candle-power will produce practically the same illumination. Phosphorescent light, in its very nature, is a diffused light, and the actual candle-power of such lamps is therefore not the only feature to be considered. To properly compare the cost of the diffused light from such lamps with that from incandescent lamps, an experiment should be made by lighting the same room first with one kind and then with the other, noting the different effects, entirely independently of the candle-power

of either of the lamps; from such an eminently practical test the relative costs could then be deduced. Even the most practical man could not object to such a test.—*Electrical World*.

A NEW PLAN FOR RAILROADS.—The plan of J. J. Heilman, to be tested on the State railways of France, gives promise of important and instructive results. It seeks to combine the advantages of electric and steam motors for railway lines, while rejecting the most undesirable features of both, and offers a system that can be adopted anywhere without change of track or rolling stock. The electric current is to drive the wheels, but it is not to be conveyed from stationary machines along the line; it is to be generated on the train, the locomotive being simply a traveling electric plant. A steam engine at the rear of the locomotive is to work the generating dynamo, which will furnish current to a small motor placed on each axle of the locomotive, and, also, when it is desirable to extend the system further, to a motor on each axle of the cars. The absurdity of converting the steam into electricity before using the power, is declared to be only apparent. The double loss in thus using the energy of the fuel is more than offset by the gain in applying rotary power direct to the axles, avoiding slipping of the rails, and making unnecessary the connecting rods, cranks and wheels, whose jar and friction absorb a great part of the motive force. The new locomotive, it is claimed, gives exact regulation of power and an increase of speed to 56 to 62 miles an hour without change of road-bed.

A NATURAL BAROMETER.—One of the most remarkable geological substances found in any part of the world is a stone believed to be peculiar to Finland, where it occurs in many localities, its peculiar property being a natural barometer, curiously foretelling, by the change of color, the probable character of the weather in the near future. It is known by the name of semakuir, and is said to turn black shortly before an approaching rain, while in fine weather it is mottled with spots of white. For a long time this interesting phenomenon was a mystery, but an analysis of the stone shows it to be a fossil mixed with clay and containing a portion of rock salt and nitre. This fact being known the explanation of the changes was easy; that is, the salt absorbing the moisture, turned black when the conditions were favorable for rain, while the dryness of the atmosphere would as naturally bring out the salt from the interior of the stone in white spots on the surface.—*Stone*.

Useful Information.

THE recently discovered platinum deposits in New South Wales have been visited by a geological surveyor, who has reported thereupon to the Minister of Mines as follows: "The platinum deposits in the Broken Hill district differ from any previously discovered. Owing to this circumstance and certain general peculiarities in the mode of occurrence of platinum and its allied metals, they possess a considerable amount of scientific interest. All commercial platinum has hitherto been obtained from alluvial deposits, where it occurs in the form of small but well defined grains scattered through gravels, etc., over wide areas. In no respects do the Broken Hill deposits resemble these alluvial ones. Authentic instances of platinum occurring in lodes are rare. J. A. Phillips mentions 'that small grains of platinum are said to have been occasionally observed in the auriferous quartz of the Beresovsk mines.'

ASPHALT FLOORING.—An asphaltic-concrete material for floors is described in *Indian Engineering* under the name of "bastard asphalt flooring." It consists of a six-inch layer of one-inch broken stone boiled in tar, with an upper one-half-inch layer of coarse gravel or small stone chips and slaked lime (two parts of the former to one part of the latter), boiled in a mixture of coal tar and pitch, both layers to be rolled, and the upper one finished with a top dressing of sand one-fourth inch thick and again rolled. This description of flooring has been used for freight shed platforms, etc., and found to be durable and satisfactory when not exposed to the sun. For the floors of ordinary buildings, a thickness of three inches is sufficient. The tar must be well boiled.

THE CUNNING SPIDER.—Everyone has no doubt noticed that when a spider's web is touched the insect will violently shake the web up and down, but few are probably aware of the reason for this curi-

ous action. The spider is well provided with eyes, but its sight is very limited; so much so, in fact that if a fly is caught in the web and lies perfectly still, the spider will often be unable to find it for a considerable time. When in doubt as to what quarter of the web the prey has lodged on, the spider always shakes the web and determines by the resistance the whereabouts of its game. It does so, too, with almost infallible accuracy, as any one who has the curiosity to make the experiment can determine, for in the majority of cases, after the spider has given its web a good shaking, it will start off in a run directly to the point where the intruder is lodged.

MIND THE LITTLE THINGS.—A young artist once called upon Mr. Audubon, the great student of birds, to show him some drawings and paintings. Mr. Audubon was much interested and, after examining the work of the artist, said: "I like it very much, but it is a little deficient in details. You have painted the legs of this bird nicely, except in one respect. The scales are exact in shape and color, but you have not arranged them correctly as to numbers." "I never thought of that," said the young artist. "Quite likely," said Audubon. "Now, upon this upper ridge of the partridge's leg, there are just so many scales. You have too many. Nature does her work perfectly. Examine the legs of a thousand partridges, and you will see that the scales are the same in number. All partridges are made alike." The lesson shows how Audubon became great—by patient study in small things.

STRANGE DIVERSIONS.—The Roman Emperor who used to divert himself by impaling flies on his stylus, or pen, has a modern imitator in an Australian judge. This eccentric jurist derives great pleasure from catching flies in the palm of his hand while hearing arguments on the bench. It is always instructive to consider the tastes and amusements of the truly great. One of Harvard's most celebrated professors, the author of works on botany with which every schoolboy is familiar, used to find keen delight in catching mice with his fingers. Another Harvard professor, whose erudition has made him famous in Europe as well as in America, says that the most delicious of all odors that please the nostrils of man is the incense that arises from a cook's frying-pan.—*New York World*.

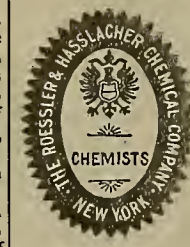
FOOD FOR YOUR PLANTS.—Give your plants all the sunshine possible, most of them revel in it, writes Eben E. Rexford in the "Ladies Home Journal." It is food for them and quite as necessary as a rich soil. Ferns, some of the begonias, and a few other plants, prefer to remain in the shade, but they like a good light, such as comes from diffused sunshine. Put your fuchsias where they will get the sunshine of the forenoon, and give your heliotropes and geraniums a southern exposure. Plants like the Bermuda lily, azaleas and oleanders should be kept out of strong sunlight if you care to have the flowers last well. Be sure to give them fresh air daily.

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WEEKLY EXCURSIONS!

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A Garbage Crematory Test.

The garbage crematory erected in the city off-yard at the foot of East Brookline street, on Albany street, by the Brown Developing Company, was tested to-day in the presence of members of the city government, and the results were apparently quite satisfactory. The crematory is about 23 feet long, 10 feet wide and 10 feet high, and has fire-brick walls a foot thick, covered with boiler steel, braced with great iron rods to keep them from being forced apart by the heat. The receptacle for the garbage has a capacity of several tons, and is fed through openings in the top with iron covers. The furnace in which the fire is started is a part of the structure, and is fed with crude petroleum conducted by means of pipes from a large tank a considerable distance away. A wood fire is first started and then the oil is turned on, and, with other devices for generating inflammable gases, an intense heat is soon produced. A blower, run by a six-power steam engine, forces this fiery mass into the receptacle for the garbage, which is slowly fed in until it becomes a burning mass. After that the combustion is very rapid, the garbage disappearing almost as rapidly as it can be shoveled in. There are two chambers for its reception, and there is a system of draughts by which all the smoke and gases go from one to the other, making a complete circuit of the crematory, and then what is left escaping to the air through a high chimney.

In the test to-day all kinds of stuff were fed into the furnace just as they came from the places where they were collected, tin cans, bottles, bones and similar matter being disposed of. From 25 to 30 gallons of oil, costing about three cents a gallon, were used each hour, consuming from four to five tons of offal an hour. Scarcely any ashes are made. The amount of garbage collected by the city each day is 200 tons, and it is estimated that this can all be consumed by four furnaces at a cost of about 25 cents a ton. The whole operation is remarkably free from odor, and scarcely an offensive smell is noticeable as coming from the furnace.—Boston Transcript.

Bottle-Blowing by Machinery.

At the present time the eyes of the bottle-making world are turned to New Jersey. Their glance centers upon Woodbury, for in that quiet village the destiny of the bottle-blower may be said to be on trial. The Ashley bottle-making machine has been set in operation to see if it cannot do the work of human hands and lungs, and do it better and more economically. The machine was described before the British Association in 1889, when it was stated that bottles had been made by the machine, quite complete, which had successfully been subjected to an internal pressure of 300 pounds to the square inch. The career of the machine in England, we believe, has been most fortunate, but this does not at all diminish the interest which its introduction into America has excited. The advantages to be gained by the use of such a machine are much too solid to permit small obstacles to hinder its success. The trial run at Woodbury has been very successful. The automatic principle has not been developed to the full extent in these machines, but it has been carried so far that one man and three boys—none of them necessarily skilled glass-blowers—can operate two machines, each of which is capable of turning out two bottles a minute. The machine does not gather the glass. One of the boys, the "gatherer," is specially detailed for that service. He feeds the molten "metal" to the machine, in which it is mechanically molded, the neck and mouth formed, the interior blown by means of compressed air, and the finished bottle automatically delivered to a carrier, which takes it to the annealing oven. There is undoubtedly room for improvement both in the performance and the capacity of the machines. But the important step has been taken, and bottles have really been made in this country by machinery.—Popular Science Monthly.

Weldless Tubes.

A new method of making weldless, cold-drawn steel tubes, suitable for bicycle-making and other machine work where strength, lightness and accuracy are required, is described by an English technical journal. The steel from which the new tubes are made is of special quality, and is received from the steel works in the form of sheets. Circular flat discs are then cut out of the sheets. These discs are pressed into the

form of shallow cups, which are then pressed successively through dies of decreasing diameter and increasing the length of the cups until the flat discs of steel have assumed the form of tubes of the required length, with one end closed. The closed end is cut off after the final drawing operation has been performed. The process, it is explained, is not unlike that used for cartridge-drawing. The tubes are produced of any size from 1 3/4 inches diameter to 1.16 inch diameter, are absolutely parallel inside and outside, perfectly concentric and of any gauge down to No. 30.

High Steam Pressure.

It is well settled, says the *Scientific Machinist*, that engines can be worked with a less consumption of steam if run at a high boiler pressure, on either the compound or other multiple-expansion systems, than at low pressure, and the present tendency in steam engineering circles is toward an increase of pressure rather than a decrease. What the exact ratio of gain is as the pressure is increased has not been absolutely determined by any experiments of which we have record, says the *Engineering Record*, but there are sufficient data which may be obtained here and there to make the fact of the increased saving certain. For example, there are experiments on record showing that a compound engine of the Corliss type, working under 80 pounds pressure, will use from 16 to 17 pounds of steam per horse power per hour. There are other cases where a similar engine at 110 pounds pressure uses from 13 to 15 pounds of steam per horse power per hour. Other data are available which show that at 150 pounds pressure the consumption of steam is reduced by triple-expansion engines to 13 pounds, or, perhaps, as low as 12 1/2 pounds. Making allowances for differences in the type and condition of different engines from which data have been obtained, there is ground for the belief that with an increase of pressure from, say, 100 pounds to 150 pounds in the compound engine, with suitable change of proportion to realize the full advantage due to expansion of the steam, there is at least 10 per cent, and, perhaps, 15 per cent saving in the engine carrying the higher pressure. Without going into refinements, there is further reason to believe that between a compound engine running at 100 pounds, and a triple-expansion engine running at 150 pounds, both suitably proportioned and loaded, there is a similar gain of at least 10 per cent, and, perhaps, 15 per cent, due to the engine working under the higher pressure and greater expansion. These figures are given to show the general feeling among those who are well informed, rather than to define exactly the relative economies; and it may further be added that they are intended to indicate the relation which exists in engines which are in good order and well maintained, and the relative economy only in the consumption of steam.

To secure the benefits of high pressure it is necessary to provide extra strength in the boilers, in the steam piping and in the engine itself, or at least in the high-pressure cylinder, to withstand the increased strains. It is necessary to employ more stable joints, besides a better class of packing, and the whole equipment must be adapted, in its various details, to resist the stronger forces which are brought to bear upon it. When the plant has been well designed for these special duties it must, when set to work, be watched with increased care, and by a more skillful class of attendants, to keep it properly maintained, than one designed for low pressures. The breaking out of packings, and the increased wear of steam valves and pistons in the engine, introduce waste where high pressures are carried, which may be entirely absent where the pressures are limited to those which have been common in the past. Extra wear and tear and depreciation and the losses of steam and fuel which they cause, are the accompaniment of excessive pressures even when the construction is of the best class, and these, so far as they act, offset the intrinsic advantage which might otherwise be obtained. The interest and depreciation charges on the more complicated and expensive plant, the waste of steam referred to, the extra cost of attendance, and the increased cost of repairs and supplies, use up at best a large part of the saving of fuel, which can be made by the more economical engine, and these may become, with careless management, even larger in quantity than the entire amount of saving so that the use of high pressure produces a net loss rather than a gain.

Unless those who are intending to profit by employing excessive steam pressures and a properly proportioned engine, either of the compound or triple expansion class are prepared to combat the difficulties in handling

increased forces here briefly referred to, and make proper allowance for the waste of fuel and current expenditures incident thereto, it is almost folly to expect in the end satisfactory results.

Scientific Progress.

The Acids of Fruits.

Mr. George W. Johnson, in his *Chemistry of the World*, says in describing the "vegetable food of the world:"

"The grateful acid of the rhubarb leaf arises from the malic acid and binoxalate of potash which it contains; the acidity of the lemon, orange and other species of the genus *Citrus* is caused by the abundance of citric acid which their juice contains; that of the cherry, plum, apple and pear from the malic acid in their pulp; that of gooseberries and currants, black, red and white, from a mixture of malic and citric acids; that of the grape from a mixture of malic and tartaric acids; that of the mango from citric acid and a very fugitive essential oil; that of the tamarind from a mixture of citric, malic and tartaric acids; the flavor of asparagus from aspartic acid, found also in the root of the marshmallow; and that of the cucumber from a peculiar poisonous ingredient called fungin, which is found in all fungi, and is the cause of the cucumber being offensive to some stomachs. It will be observed that rhubarb is the only fruit which contains binoxalate of potash in conjunction with an acid."

"It is this ingredient which renders this fruit so wholesome at the early commencement of the summer, and this is one of the wise provisions of nature for supplying a blood purifier at a time when it is likely to be most needed. Beet root owes its nutritious quality to about nine per cent of sugar which it contains, and its flavor to a peculiar substance containing nitrogen mixed with pectic acid. The carrot owes its fattening powers also to sugar, and its flavor to a peculiar fatty oil; the horse radish derives its flavor and blistering power from a volatile acrid oil. The Jerusalem artichoke contains 14 1/2 per cent of sugar and three per cent of inulin (a variety of starch), besides gum and a peculiar substance to which its flavor is owing; and lastly garlic and the rest of the onion family derive their peculiar odor from a yellowish, volatile acrid oil, but they are nutritious from containing nearly half their weight of gummy and glutinous substances not yet clearly defined."

Solidified Air.

We learn from an English exchange, says *Iron Age*, that Prof. Dewar, who recently demonstrated his experiments in the liquefaction of air before the Royal Society of London, has communicated to that body, at a late session, a most interesting development of his experiments upon air at very low temperatures. He is stated to have now succeeded in freezing air into a clear transparent solid. The precise nature of this solid is at present doubtful, and can be settled only by further research. It may be a jelly of solid nitrogen containing liquid oxygen, much as calves'-foot jelly contains water diffused in solid gelatine. Or it may be a true ice of liquid air, in which both oxygen and nitrogen exist in the solid form. The doubt arises from the fact that Prof. Dewar has not been able by his utmost efforts to solidify pure oxygen, which, unlike other gases, resists the cold produced by its own evaporation under the air pump. Nitrogen, on the other hand, can be frozen with comparative ease. It has already been proved that, in the evaporation of liquid air, nitrogen boils off first. Consequently, the liquid is continually becoming richer in that constituent which has hitherto resisted solidification. It thus becomes a question whether the cold produced is sufficiently great to solidify oxygen, or whether its mixture with nitrogen raises its freezing point, or whether it is not really frozen at all, but merely entangled among the particles of solid nitrogen, like the rosewater in cold cream. The result, whatever may be its precise nature, has been attained by the use of the most powerful appliances at command—a double set of vacuum screens combined with two powerful air pumps. Upon either view of its constitution, the new solid is in the highest degree interesting and hopeful.

ARTIFICIAL GEMS.—Diamonds, sapphires, rubies and emeralds are admired for both their scarcity and their intrinsic qualities; chiefly the latter. There are numbers of things scarcer than diamonds, for instance, the metals thallium and rubidium. Rubies

and emeralds are but crystals, as are snow-flakes and rock candy. They are extremely hard, and can be fused only in an electric furnace. They are composed of aluminum and oxygen. This compound is found uncrystallized in great abundance, and when fused in an electric arc it becomes as hard as the ruby, and any color may be given to it. If not allowed to cool too quick, it crystallizes and may then be polished, when it is an artificial gem. Dealers in gems have for commercial reasons agreed not to call such stones gems, because they were not so-called natural products. It should be remembered however, that no one can endow matter with the physical qualities that make a gem an object of admiration; crystallization, density, hardness, color, refraction and so forth are inherent in the substance, and do not depend upon whether the material is assembled in the laboratory of Faust or Vulcan. Faust with a dynamo can turn out a product as good as Vulcan with his forge, and, if he be encouraged, will soon bring to the poorest in the land the most beautiful things; and will make the distinction between the rich and the poor to be only one of quantity, not the quality of one's possessions.

Progress in American Archaeology.

The science of American archaeology and ethnology owes a large and increasing debt to Professor F. W. Putnam, who represents those branches in the faculty of Harvard University, and who is also Curator of the Peabody Museum, and Chief of the Department of Ethnology and Archaeology of the World's Columbian Exposition. All these posts he fills admirably, as any one will see who will read his Report of the Peabody Museum for 1892, just issued. One fact will be sufficient: that within the last two years he has engaged, trained and sent into the field—and the field means the whole American continent, from Greenland to Tierra del Fuego—about 100 assistants and students, actively interested in collecting archaeological and ethnological material. He says with pardonable pride and entire justice: "Never before has such an extensive field of anthropological research been covered in two years' time." A brief reference to the results obtained is included in the report. Naturally, the exploration of the wonderful ruins of Copan, Honduras, is most prominently alluded to. In connection therewith Professor Putnam cannot refrain from a mild indulgence in his favorite *manie*, hinting at the discovery of "several facts pointing to Asiatic arts and customs as the origin of those of the early peoples of Central America." (Shade of Brasseur de Bourbourg!)

With like enthusiasm, though on a less scale, the Department of Archaeology of the University of Pennsylvania sent several explorers to the field in 1892, and has added largely to its collections by their efforts; while the National Museum, the Bureau of Ethnology, and the Smithsonian Institution, will show in time by their reports that the year was also singularly fruitful for them.—Science.

THE RELATIVE IMPORTANCE OF CONTAGION AND HEREDITY IN THE ETIOLOGY OF PHTHISIS.—Riffel has collated the statistics of births and deaths of all the families of a small district in Germany with special reference to this point, and from them comes to the following conclusions: There are very few families which, in the course of time, are not attacked by consumption, and when it once enters it is usually progressive, and by marriage propagates itself in other families, sometimes, however, sparing whole generations. The death rate among children in consumptive families is very great, especially where both parents have an hereditary taint; if one only is affected, it is immaterial whether it be the father or mother. The transmission of the disease from one person to another, or from husband to wife, or vice versa, or through dwelling-houses, could not be proved to have taken place. The children of phthisical parents often developed consumption, even if they had left their parents' house while still perfectly well and had gone to other dwellings or even other localities.—Boston Medical and Surgical Journal.

ACCUMULATORS.—A German firm is starting the business of supplying charged accumulators to buildings, and replacing them by others when discharged. It appears to be limited to the lighting of a few lamps only. For a battery for running two lamps of 16-candle power six hours a day, the charge is \$6.40 per month, and for four lamps \$8.50 a month. Each consumer receives two charged batteries, of which only one is used, the second answering as reserve while the first is being charged.

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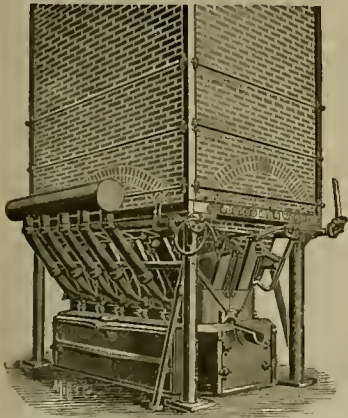
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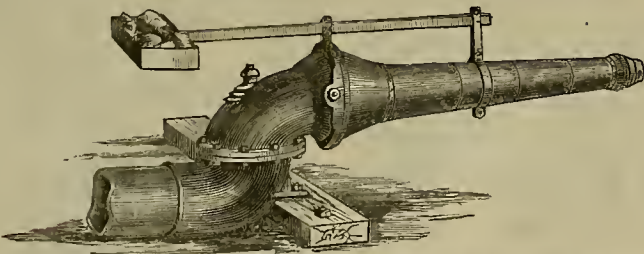
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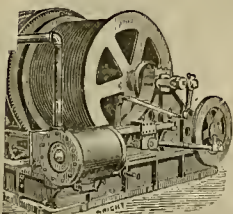
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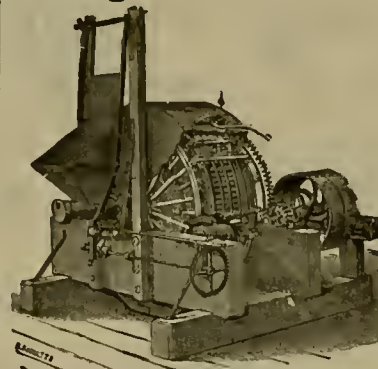
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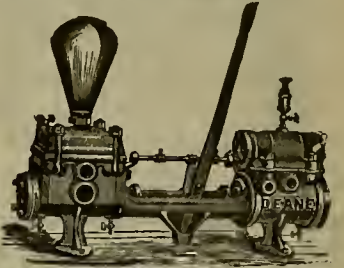
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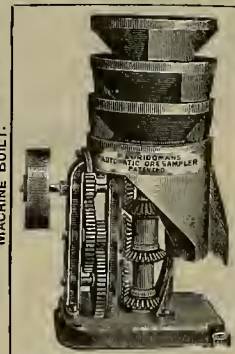
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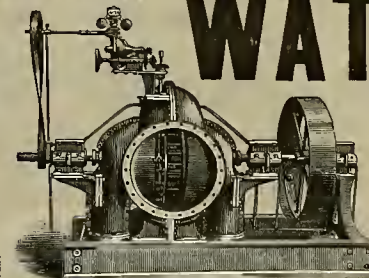
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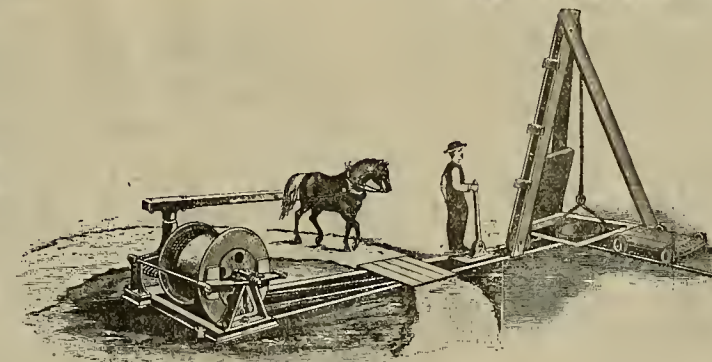
The hoist gear on the drum shaft is loose, and, in hoisting, drives the drum through a friction clutch. This avoids the frequent accidents occurring with other Whims, occasioned by the breaking of the gear teeth when throwing them out of gear. In lowering, the drum is pressed by a powerful screw lever against brake woods at the opposite end. Perfect means of adjustment are provided for the friction clutch and brake blocks.

As the drum is entirely independent from the driving gears the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature not possessed by any other horse hoist in the market, and one that greatly increases the capacity of the machine by avoiding the loss of time due to stopping and starting the horse.

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Weight of hoist, 1200 lbs. Total shipping weight, including sweep, levers and sheaves, 1400 lbs.

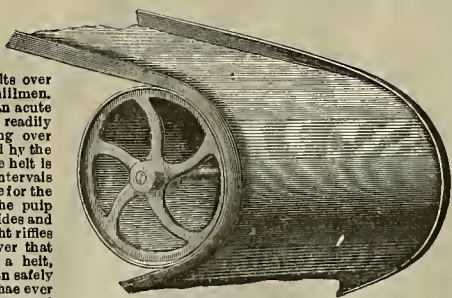
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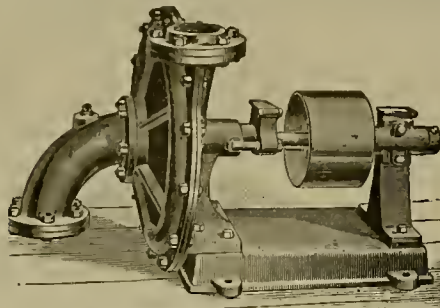
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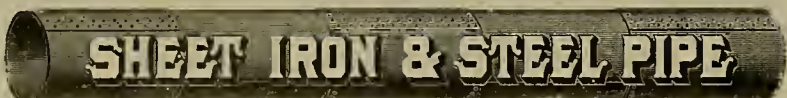
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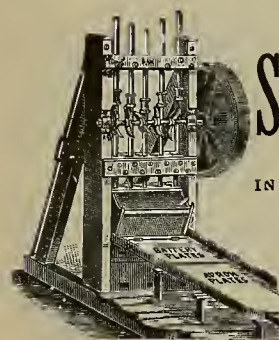
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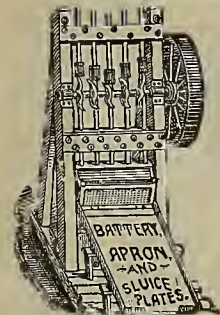
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

To Develop.—Amador Ledger, April 7: Tony Reale returned last week from San Francisco, accompanied by his friend George Dahl. They are now up inspecting Mr. Reale's mine at Forty-Nine Flat. Mr. Reale says he hopes to make arrangements whereby he can thoroughly develop this property in the near future.

Copper.—Colonel Robinson, owner of the New-tou copper mine, near Ione, has secured a working bond on 4 500 feet of the quartz lodes within the Garavanta ranch at Middle Bar, and will commence work immediately. The Colonel will return in a day or two from San Francisco with his family and will build a dwelling house near the scene of the proposed operations.

Bay State.—Superintendent W. T. Jones of the Bay State, near Placerville, reports that operations at the mine are progressing as rapidly as the nature of the work will permit. The water in the shaft is now down 200 feet, and is being lowered at the rate of sixteen feet per day. If nothing unexpected happens, it will take about seven days to reach the tunnel. Assessment No. 13 has all been paid, there being no delinquencies.

Butte.

The Spring Valley Suit.—A case was submitted to Judge Brewster of Placer county on Friday last involving points of the highest importance in mining circles. The Spring Valley Hydraulic Mining Company, incorporated under the laws of New York State, owned extensive mining property in Butte county, this State. In 1881 it executed a mortgage to three trustees, William Alvord and F. F. Low of San Francisco, and W. B. Laidlow of New York, to secure the payment of 200 bonds of \$1000 each. In 1886 there were 155 of these bonds outstanding, and there was also an indebtedness to the Bank of California. As the stock was unassessable under the laws of New York, the property was conveyed to a California corporation named the Spring Valley Gold Mining Company, but this corporation failed, and the Bank of California, Rideout, Smith & Co. of Marysville, and Charles Waldeyer obtained judgments to a large amount. The trustees brought a foreclosure suit in the Superior Court of Butte county and made both the old and the new corporation defendants. There are no less than ten points on which the plaintiffs and trustees are unable to agree, and all the propositions are now being submitted. The bondholders and trustees are represented by Henry E. Highton and T. Z. Blakeman, the Spring Valley Gold Mining Company by C. W. Cross, and the Bank of California by J. M. Allen.

Calaveras.

West Point.—Calaveras Chronicle, April 8: West Point has looked quite blue for quite a long while, but I am now happy to state things are beginning to brighten. The Lone Star Mine is progressing finely. James G. Role, Esq., the superintendent, is expected back from Wisconsin soon, where he has been in council with the company, relative to the sinking of a shaft upon the property. The shaft thus proposed, as near as can be ascertained, is to be sunk from the top of the hill—it will be remembered the mine is in the bottom of the North Fork Canyon—below the river bed. The extensive operation of sinking from the hilltop is for the purpose of taking out the ore between the tunnels and the surface of the hill. The mine is now working a crew of about thirty-seven men. The Blazing Star Mine has started up with a crew of about eighteen men, with Mr. C. J. Moore as superintendent and Richard McGee, foreman. There is some talk that Mr. Foster, the owner of the property, is going to put up works and work the ore by the new electric process. The Oatis, Mithenbaur & Co's mine, situated about two and one-half northwest from this place, is about to resume operations with Prof. H. C. Oates as superintendent. It will be remembered that last fall this mine proved to be a valuable piece of property, the ore prospecting between \$80 and \$100 per ton.

To Resume Operations.—We have been informed that the Eureka Mining & Lumber Company will commence work on their mines in the West Point District in a few days. The company also intend to run their saw mill and they will have for sale all kinds of lumber at reasonable prices. The officers are as follows: Joel Rowe, superintendent; W. D. Harris, secretary; J. M. Thomas, treasurer.

Mono.

An Important Lease.—Bodie Miner, April 1: A. P. Cameron, Archie Graham and James A. Kelly have secured a year's lease of the Noonday and Red Cloud. Considerable rich ore was taken out of these mines in early days, and there is undoubtedly a great deal more to be unearthed. Heretofore the owners have pursued a dog-in-the-manger policy—doing nothing themselves and refusing to give others a chance to do anything. It is the intention to work only the Noonday at present. Messrs. Cameron, Graham and Kelly are all practical miners and their lease will very likely prove a bonanza to them.

Affairs at Benton.—Bodie Miner, April 7: Supervisor William Calnan, of Benton, was in town the early part of the week on his way to Bridgeport. He denies emphatically that there was any shooting over mining claims there a week or so ago. The owners of the Little Emily and Modoc claims have had a dispute over boundary lines, and both sides are now restrained from working, pending a settlement of the affair by the U. S. Court at San Francisco. The trial of the case will probably take place

this month. The strike said to have been made there recently must have originated in the mind of some imaginative person who has no particular regard for the truth. Of course, it is well known that some rich gold has been found near Benton in the past, but not in sufficient quantity to make a bonanza. At present little or nothing is being done around Benton, as the hills are covered with snow. As to a boom being experienced there in the spring, it is all nonsense, and such a presumption is in no way justified by the present conditions.

The Bodie Con.—Bodie Miner, April 7: During the past week east crosscut, 300-foot level, was extended 7 feet. North drift, 200-foot level, Lent shaft, was extended 11 feet. West crosscut, same level, was extended 16 feet.

The Mono.—During the past week east crosscut from main south drift, 550-foot level, was extended 15 feet. North drift from east crosscut, 400-foot level, was extended 13 feet. There were employed 4 miners, 1 carman, and jointly with Bodie, 1 engineer, 1 blacksmith, 1 watchman, 1 foreman.

Nevada.

Good News From Olin.—Transcript, April 8: The Olin Gravel Mining Company are now in gravel and it prospects well. They will commence washing very soon. They are now running two drifts, thereby increasing their force of men. The Olin, Maozanita, Yosemite, Harmony and West Harmony will have booming times before long.

Some Fine Specimens.—Grass Valley Union, April 9: Messrs R. R. and W. Dunstan yesterday showed a Union reporter some specimens of rock taken from the Dunstan claim near Rough and Ready. The rock was filled with coarse gold, specimen rock in fact. They have a twelve-inch ledge which shows well in coarse gold.

The Baltic Mine.—Grass Valley Union, April 9: The Baltic mine, situated near Rough and Ready, still continues to be looking well, and the prospects of its being a good paying mine are very good. Several bids have been received for a contract to furnish machinery and build a new mill, and in less than three months the company expect to have a five-stamp mill running. The ledge is twelve inches wide, which is very encouraging to those interested. As soon as the contract for the mill is awarded additional men will be put to work stoping and taking out rock. The cave that occurred in the tunnel last week has been repaired, and the tunnel is clear. An assessment of two cents a share was levied on the stock to help defray the present expense and to use a part as a reserve fund for future use. One more assessment will be sufficient to pay for the building of the mill and such other repairs as are necessary. We hope to see in the near future a large number of men wending their way daily to and from the mine.

North Banner.—At the annual meeting of the stockholders of the North Banner Consolidated Tunnel Company held Monday afternoon, the following gentlemen were elected directors: George Fletcher, Grass Valley; John F. Kidder, Grass Valley; E. H. Brown, Grass Valley; Joseph Weissheim, Grass Valley; Julius Jacobs, San Francisco. After the adjournment of the stockholders' meeting the board-elect assembled and organized by electing officers as follows: George Fletcher, president; John F. Kidder, vice-president; E. H. Brown, treasurer; Thos. J. Michell, secretary.

At the Copper Mine.—Transcript, April 5: From a recent visitor to Spenceville it is learned that everything is booming in that burg. Mr. Rohrbacher of San Francisco, treasurer of the Imperial Paint and Copper Co., is now in Spenceville, and, in addition to the men already employed, a number will soon be put at work. The old furnaces connected with the paint works are to be torn down and new furnaces of the most advanced modern type to be completed at once. The Spenceville paint, a California product, will soon be in demand all over the United States. From the mine, copper is constantly being produced and shipped in the form of cement to the market, where it is in strong demand. This thriving little town is one of the most prosperous of our communities. The works are under the able superintendency of Mr. Otto Woehler, well known throughout the county. The following are the officers of the company: Pres., R. Herman; Sec., Louis F. Dunand; Treas., P. Rohrbacher; Supt., Otto Woehler.

Plumas.

From Greenville.—Plumas National Bulletin, April 8: D. McIntyre, the Greenville merchant, was in Quincy Saturday on business. He reports Greenville prospering to its usual extent. As soon as the snow leaves at Wolf Creek he will start his mill there to crushing ore from the Blind Lead mine. John Taylor has been in charge of the work there during the past winter and has been running a new tunnel, which will permit the ore to be dumped directly into the mill. Firmstone & Richards are extracting ore from the Phoenix mine in North canyon and will crush it in the Johnny Bull mill. The vein is small but the ore is of good quality. At the Indian Valley mine, W. S. Drury recently finished retimbering the main tunnel, otherwise no work has been done on that property lately. Mr. Prentiss, the chief owner and superintendent of the mine, is in the East. In that section the snow is rather low down on the mountain.

Siskiyou.

Cinnabar.—Yreka Journal, April 5: The rich strike of cinnabar on Klamath river, below Oak Bar, and opposite the mouth of Horse creek, promises to be the richest quicksilver mining district in the State. The discovery is but a few feet from the wagon road leading down the river from this part of the county, thus requiring no great difficulty in reaching railroad communication via Humbag Creek, Hawkinsville and Yreka. The specimens shown are excellent and contain as large

percentage of quicksilver as the best lodes yet discovered anywhere in the State. The south wind and warm rain last Wednesday night melted the snow very rapidly and the ditches and little streams are now well supplied with water for operating the hydraulic mining giants and running quartz-mills, as well as furnishing an abundance for all other kinds of mining.

Gravel.—Anstin & Co., of the Greenhorn blue gravel mine, having pumped out last week, are now hoisting pay gravel with good success, the gravel yielding good returns. The paying strata on bedrock varies from one to six feet thick, and is extensive enough for at least ten years' steady work, with prospects of further strikes of blue gravel in various portions of Yreka basin. In fact blue gravel, like that on Greenhorn, is found anywhere in this vicinity, and the yellow gravel like that found in the Yreka townsite also pays well—not less than 25 cents to \$1 to the pan at bedrock, but cannot be worked only by owners of town lots an every lot-owner has a patented deed from Government.

Placers.—Some rich placer mining claims have lately been discovered on Elliott creek, near the summit of Siskiyou mountain, in the Beaver Creek region, but there is too much snow in the vicinity at present to do much work in developing them, although the creek is clear of snow where the diggings are located. The weather in that high altitude is cold most of the time at present, to keep the snow from melting, hence there is no water to start work, but an abundance may be expected very soon, as it is about time for the warm days of genial springtime. The Spangler Bros. are now busily engaged in getting their new 15-horse power double-action steam engine in position for work at mouth of Humbag creek, and within a couple of weeks expect to commence opening the creek bed from Klamath river up, where they have to excavate at least 30 feet by the use of derricks in lifting the crates of gravel and hoisting out boulders. Brooks & Co. of Quartz Valley, are taking out a large amount of fine quartz from their four-foot ledge which pays from \$10 to \$20 per ton. Splan & Co., of Quartz Valley, are also taking quartz from a 20-inch lode that pays \$10 a ton. David Stary, in same locality, is finding richer quartz than ever in his ledge at the Hull Gulch section of Quartz Valley. Messrs. Detwiler & Keith, cinnabar experts from El Paso, Texas, are down on the Klamath in Oak Bar district, also Mr. Bradford, of the Bradford Bros. cinnabar mine of Lake county, and Mr. Newcomb, of the famous Oak Hill cinnabar mine in Napa county, is expected there soon to start operations at the Beaver Creek cinnabar mines in the Siskiyou foothills. Barton & Lange are at work on their newly-discovered cinnabar mine below Oak Bar, on the Klamath, and think they have a big thing in the cinnabar line, but cannot unbosom a mountain in a day. Everything looks good as far as developed. Cinnabar is found in good quantities in the foothills and tributaries along the Klamath from Beaver creek for many miles down the river and up into Siskiyou mountains and all the foothills bordering the river, making a fine field for prospectors.

Trinity.

A Bro Mining Deal.—Redding Democrat, April 4: Some weeks ago a party of four arrived here from Denver, Colorado, and took a four-horse conveyance and went to Trinity county. The party was composed of a French haron and his wife, another rich Frenchman named Beandry, and L. R. Bailey, a banker at Ouray, Colorado, who chaperoned the party. Their visit to Trinity was to inspect the Hubbard gravel mine, which they purchased last year for \$25,000, and on which they had expended \$50,000 in a big ditch to carry water on to the claim. When the party arrived at this mine piping was in full blast, and after a run of 40 hours \$1500 was cleaned up from the boxes. The same party then spent some days in making a thorough investigation of the Lovernage mine. This property is situated in Oregon Gulch mining district, four miles northwest of Weaverville, and was located about 1851. It consists of 154.40 acres and water ditches taking water from West Weaver creek and Rnsh creek. The examination of this property resulted in a sale to Mr. Bailey and the Frenchmen for \$250,000. After closing the deal the party returned here Saturday evening and took the overland train for San Francisco. We are informed that it is the intention of the new owners to expend a large sum of money supplying the mine with more water and will work the ground on a very extensive scale.

A Good Cleanup.—Journal, April 9: A. G. Dunbar, manager of the Hubbard mine, came up Thursday with the cleanup after a 12-days' run. One of the prettiest reports we ever saw was the one Mr. Dunbar showed us that day. The cleanup weighed 214 ounces and is expected to mint a little over \$4000. The flumes only were cleaned up, and it is estimated that the under-currents contain from \$500 to \$1000. The company has about 300 inches of water delivered at the mine, which is reservoir and discharged through a five-inch nozzle. The actual time the pipe was playing on the bank was 125 hours. This is an extra good showing for the amount of work done. Thursday the last payment, \$13,000, was paid by the company to H. Jankins and he delivered the deeds to the company's manager, Mr. Dunbar. This company has fulfilled every agreement it has entered into, and we hope they will get many times the purchase money out of the gravel bank.

Tuolumne.

Rawhide District Mines.—Tuolumne Independent, April 8: We hear, from undoubted authority, that Mr. Richard Chute, of San Francisco, has decided to open up his mine as soon as the weather permits, and that he has an option on Mr. Jack Jackson's Isabella and

Gem Consolidated mines, which adjoin Mr. Chute's Rappahannock to the north. The reason he requires and proposes purchasing the latter property is on account of the great natural advantages Mr. Faxon's mine and location possesses, owing to his valuable water-power, which can only be obtained on his property. Either water (transmitted by cable) or electric-power will be adopted, which will be decided when Mr. Chute comes to Sonora very shortly, when he will have the necessary surveys made which will determine all matters therewith. The power mentioned is sufficient to drive all the machinery and mills in that section and the only available one. The opening up of these mines will give considerable impetus to mining generally in the county and we wish Mr. Chute success. It is assuredly a rich section as any in the State, and being on the famous mother lode of California adds considerably to their known value.

At Work.—The Golden Gate mine resumed operations on Thursday. As this mine employs from 30 to 50 men, its revival is encouraging to our business interests.

NEVADA.

Washoe District.

Con. Cal. & Va. Mine.—Virginia Chronicle, Apr. 8: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stopes, from the 10th to the 15th floors above the sill floor of this level. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connecting with the north drift on the 1500 level; also extracting a few tons of ore from the old stopes east of the main south drift. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the unraise No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. From the drift run west from these north workings, 27 feet up, the upraise started 50 feet in from the mouth of the drift, has been carried up 14 feet in a porphyry and quartz formation. In working in the north and south sides—partly in old timbers—of the drift run east (at a point 20 feet down) from the winze which was sunk from the west crosscut from the main northwest drift, we have extracted some ore of fair quality. Have extracted the week from all parts of the mine 653 cars of ore, about 645 tons. Shipped to Morgan mill 376 200-2000 tons of ore. Average assay value, per railroad car samples, \$32.50. The mill started up on the 7th inst. and worked 90 tons, the assay value of which, per battery sample, was \$31.65 per ton. Bullion shipped to the Carson Mint, assay value, \$33,376.52.

Ophir.—500 level—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level—The winze now going down below the sill floor of this level has been sunk during the week 14 feet; total depth, 40 feet. The bottom is in porphyry and clay showing streaks of quartz which carries a very low assay value.

Mexican.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 21 feet; total length, 110 feet, continuing in a hard porphyry formation carrying clay separations and showing fine lines of quartz. 500 level—Have continued making necessary repairs, jointly with the Ophir Co., in the west drift from the Ophir shaft on this level.

Utah.—340 level—The south drift from the main west drift at a point 535 feet in from the shaft has been extended 8 feet; total length, 237 feet; continuing in porphyry, clay and quartz formation. Have resumed work in west crosscut No. 3 from the north drift, and extended the crosscut 5 feet; total length, 81 feet; in quartzite and clay formation.

Sierra Nevada.—The intermediate tunnel on Cedar Hill has been advanced during the week 16 feet, making the total length 266 feet; the face is porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 22 feet, making the total distance west of the joint shaft 3079 feet; the face is in hard porphyry and small streaks of clay.

Union Shaft.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 22 feet, making the total distance west of the joint shaft 3079 feet; the face in hard porphyry and small stringers of clay.

Andes.—North drift from east crosscut No. 1 north on 420 level advanced 14 feet; total length, 201 feet; formation, clay and quartz. We have also been timbering in this drift.

Best & Belcher.—200 level—The northwest drift has been extended 20 feet, passing through porphyry, clay and quartz; total length, 215 feet. 900 level—The southwest drift started in west crosscut No. 3, 20 feet from top of upraise No. 1, 1000 level, has been extended 13 feet; total length, 78 feet; face in hard porphyry. Sutro tunnel level—The joint east crosscut with Gould & Curry Co. has been advanced 22 feet; total length, 29 feet. Work has been temporarily discontinued in this crosscut. We are repairing and cooling the Gould & Curry old drift, leading to the winze which was carried down by them from the 1600 to the 1900 level, so that a more accurate survey can be made to locate this winze, that the same may be connected with our joint north drift. This connection will give good ventilation and enable us to resume work in this drift.

Gould & Curry.—200 level—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been advanced 16 feet; total length, 416 feet;

face in hard porphyry. Suro tunnel level—The joint east crosscut with Best & Belcher Co. has been extended 22 feet; total length, 29 feet. Work has been temporarily discontinued in this crosscut. We are repairing and cooling the old drift leading to the wioze which was carried down from our 1600 to the 1900 level, so that a more accurate survey can be made to locate this winze, that the same may be connected with our joint north drift. This connection will give good ventilation and enable us to resume work in the joint north drift.

HALE & NORCROSS.—In the main shaft are easting the timbers between the 1000 and 1100 levels. Main Incline—We continue making the necessary repairs and are doing some retimbering between the 1300 and 1400 level. 1800 level—Advanced west crosscut on our south boundary 20 feet; total length, 73 feet; face in porphyry and quartz.

CHOLLAR.—Are retimbering and repairing the west crosscut, 450 level, and retimbering the two north compartments of the main shaft above the 930 level. The east crosscut near the south line, 930 level, is out 103 feet; face is in porphyry.

POTOSI.—East crosscut No. 3, 850 level, is out 346 feet; face is in clay, porphyry and low-grade quartz. The west crosscut from the north drift, 930, is out 42 feet; face is in porphyry and low-grade quartz. East crosscut, 75 feet north of top of raise, 1000 level, is out 23 feet; face is in porphyry and low-grade quartz. The repairs to the Potosi winzes and the Ward shaft are not yet completed. Extracted and sent to the mill the past week 445 tons and 750 pounds of ore from the 550, 930 and 1150 levels. Milled during the week 445 tons. On hand at mill, 141 tons and 500 pounds. Average battery assays, \$21.41; average car sample assays, \$22.64. Shipped to U. S. Mint at Carson, 1168 pounds of crude bullion.

OCCIDENTAL.—The main north drift on the 750 level has been extended 14 feet; total length, 712 feet; the face is in porphyry and stringers of quartz. The upraise above No. 2 winze in south drift, 750 level, is up 84 feet and is showing bunches of fair-grade ore. The Zigzag drift, Suro tunnel level, has been extended 15 feet; total length of main drift, 912 feet; formation, hard porphyry.

KENTUCK.—From the stopes above the 160 level we continue to extract from two to three tons of ore per day of the average value of \$33 per ton as per car samples. The south drift from the Jacket east crosscut on 1100 level is in 205 feet and has reached the Kentucky line. The ore in the face of the drift assays from \$5 to \$40 in gold. Shipped to the Nevada Bank treasurer, bullion valued at \$2,756.85.

EXOQUEUR.—Are yet engaged retimbering the Ward shaft.

WARD SHAFT.—Are retimbering the shaft 100 feet from the surface.

ALPHA.—Are yet engaged retimbering the Ward shaft.

BULLION.—Are yet engaged retimbering the Ward shaft.

CON. NEW YORK.—The winze below the 650 level is down on the slope 123 feet; the bottom is in quartz, some of which gives fair assays. The west crosscut from the southwest drift from the shaft, 850 level, is out 139 feet; face is in hard porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week through hard porphyry; total distance from north line, 88 feet.

APAX.—Have sunk winze 45 feet; ledge steadily improving.

Spring Valley District.

PLACES.—*Silver State*, April 8: J. B. Foltz says hydraulic operations were commenced at his placer mines in Spring Valley about ten days ago. He has placed a No. 2 monitor in position, and, under a full head of water, work is being vigorously prosecuted with promise of gratifying results, as the ground now being worked is very rich, yielding as high as \$3 to the pan. Mr. Foltz was compelled to suspend operations last year on account of the water giving out just as this rich piece of ground was reached. At that time he cleared up \$300 as the result of the last two days' run. This year there will be plenty of water for working the placers at least four months, and the outlook is very encouraging. Mr. Foltz has expended considerable money in Spring Valley in the past three years, and it now seems that his efforts are to be crowned with the success they deserve.

Murphy District.

A GOLD CAMP.—*Cor. Pioche Record*, April 5: Murphy district is about 40 miles southeast from Goode Springs, in Lincoln county, and is a gold camp. The principal mines are the Longstreet, Big and Little Tiger and a claim belonging to your humble servant. The Longstreet mine is a big gold-bearing ledge, carrying some very rich rock and averaging a little over \$20 to the ton. The two Tigers, owned by W. H. Sherman, are not being worked at present. I predict a brilliant future for Murphy district. The formation is granite.

Tuscarora District.

CYANIDE PROCESS.—*Tuscarora Times-Review*, April 5: The Union Mill Company has been shoveling snow from its tailing reservoir to enable it to get the same on which to start its new cyanide plant, which is completed and only awaiting material to run on to be put in successful operation. While these tailings have refused to yield their gold and silver values up by any of the old methods of reduction, it has been thoroughly proven with a trial plant that they can be successfully and profitably worked by the MacArthur-Forrest cyanide process, the rights of which have been secured, and for which purpose the works just completed have

been built, and would have been in operation before this but for the unprecedented late spring. However, if the present favorable weather continues, they will be running in a few days, and, from the profits derived, an impetus will be given to prospecting in the North Belle Isle, Nevada Queen and Commonwealth mines, to whom the mill belongs, which, together with the labor directly employed in the new works, will make better times in this vicinity during the coming summer.

Crescent District.

RICH ORE.—*Cor. Pioche Record*, April 5: Crescent district is about eight miles southeast of Murphy, and the formation is also granite. The ledges are small, but very rich. The ore carries gold, silver and lead, and comes in the shape of fine-grained galena. Mr. Gilbert of Cedar district, in the Monkey Wrench country, is the assayer of the district, and is also the owner of some valuable claims. You will hear more of Crescent and Murphy districts. The owners of the Mexican mine, in Crescent district, shipped three carloads of ore from their mine that went \$250 per ton. The district is a good one for an industrious man—the best in the State. I cannot imagine a more independent position for a man than to be the owner of a small ledge of rich ore. It enables him to keep a wad in the bank and to take a spin or a spree when he feels that way. It's the worst luck I would wish all the boys—a stringer of high-grade stuff.

Bristol District.

COPPER FURNACE.—*Pioche Record*, April 6: Charles L. Roe has about completed arrangements for another run of his copper furnace at Bristol. Coal and other supplies are being put in and the furnace is expected to blow in about the 15th inst. The copper ore on which this run will be made comes from the old Cave mine in Bristol district. It runs high in copper and well in silver, and is easily worked. The product this time will be of higher grade than any produced heretofore.

MILL MOVING.—Teams came in from Beaver during the week, and yesterday the last of the Bristol quartz mill was shipped to the gold claims nine miles above Beaver. W. T. Rich has the contract to erect the mill and will leave for that purpose to-morrow. As it is a gold proposition, pans and settlers will not be added until a trial run of the mill is made, to see if they are necessary or not.

Ely District.

LEACHING.—*Pioche Record*, April 6: The large 50-ton tanks which will replace eight small ones now in use at the Bullionville works are now on the way from San Francisco, and advices of their shipment from Milford here are daily expected. The output of the leaching plant has been increased of late, due to higher chlorinations being secured and careful work in general. All first-class sulphides are now melted into bars before shipment, while wash water, or second-class sulphides, are shipped after being dried, only. A shipment netting some \$4500 was made last Saturday, which will assist materially in getting in shape for an increased output.

Pine Grove District.

EXAMINING MINES.—*Hawthorne Bulletin*, April 7: Commissioner Wilson informs us that there is a number of Eastern mining men now at Pine Grove. They are examining several mines in that locality with a view of purchasing the same and working them on a large scale.

Osceola District.

THE RED MONSTER MINE.—*Cor. Salt Lake Journal*, April 7: The Red Monster mine is composed of a group of parallel veins, running in an easterly and westerly direction and laying within a width of 200 feet. Across this claim there is a group of north and south veins called the Cross mine, and both constitute what is generally known as the Red Monster mine. The work done was on one of the east and west veins. A shaft has been sunk 100 feet and a tunnel run 230 feet on this vein, showing a big broken ledge dipping to the south. The ore lays in chutes, and the course of the chute in the ledge is from east to west at about half pitch. The largest chute encountered is 75 feet through and seven feet wide. From the richer decomposed parts of this ore \$1300 has been washed with a rocker, much of the gold being coarse. The largest piece was 32 ounces, but this is the exception, as an average of from \$10 to \$15 per ton is looked for. There are 400 tons of ore on the dump, and the mine, with its present development, will yield 40 tons per day for a long time, and the many places that show ore on the surface indicate that when the development is extended, a very large production may be looked for. The facilities for cheap mining here are as good as can be had anywhere 100 miles from a railroad. There is water power 1½ miles below the mine, and, by bringing in a creek 2½ miles, another water power can be constructed at the foot of the hill half a mile from the mine.

Ferguson District.

THE APRIL FOOL AND MONITOR.—*Salt Lake Journal*, April 7: D. A. Reeves, one of the owners of the April Fool group, in Ferguson district, is in town. He informs us that a shipment is en route to this market, which will average about six ounces gold and three ounces silver per ton. This ore is from the Monitor, one of the group, which has developed into a much richer property than the claim from which the group takes its name. A tunnel has been driven in 200 feet on the vein, following the footwall. At the breast a crosscut has been run 18 feet, and the hanging wall has not yet been reached. Next to the footwall there are four feet of manganese and talc averaging from 40 to 60 ounces silver and \$7 to \$8 in gold per ton. Next comes six feet carrying a value of

six ounces gold and three ounces silver per ton. The value of the remainder of the vein has not yet been ascertained. Mr. Reeves says there is some excitement in Pioche over the strike in the Demijohn mine, west of that camp, as mentioned recently in these columns.

ORE FROM THE MAGNOLIA.—J. J. Maoning, assessor from Lincoln county, Nev., is in Salt Lake, en route home from Carson. He is one of the owners of the celebrated Magnolia mine in Ferguson district. The company is at present employing seven or eight men, and two or three cars of ore, carrying four or five ounces gold per ton, are now on their way to this market. Mr. Maoning informs us that the Magnolia Company thinks of starting the old Hiko mill, in Fabranagat valley, 30 miles west of the mine, and treating its product there. The mill has a capacity of 20 tons daily.

BRITISH COLUMBIA.

AFTER ORES.—*Nelson Tribune*, April 8: Chas. G. Griffith, a representative of the company operating smelters at Great Falls and East Helena, Mont., arrived in Nelson on Friday. He has made several trips to this district as a sight-seer, but he is now here on business. Heretofore the smelters which he represents drew their supply of lead ores from the Coeur d'Alenes principally, but that supply is now being greatly reduced owing to the shutting down of several of the largest of the producing mines. The ores of the Slocan will be purchased from this time on, as they are the best ores obtainable for fluxing, owing to the high percentage of lead carried, one ton being equal to a ton and a half of concentrates from the Coeur d'Alenes mines. As an instance: Supt. Fisher of the Freddie Lee recently took a careful sample of a 50-ton shipment. The sample gave a return of 127 ounces silver and 79 per cent lead. No other country produces so uniformly high-grade ore. The smelter at Great Falls and the one at Helena have four stacks each, and a daily capacity of about 250 tons. The same company has a one-stack smelter and a refinery at Chicago.

DEVELOPMENT WORK ADVANCING.—George W. Hughes, the freighter, was in Nelson on Saturday. Asked as to the ore shipments from the mines in Slocan district, he said that had development work in the mines been as far advanced on January 1st as at this time, the number of tons shipped would have corresponded very nearly to the estimates made last fall. As it is, however, the total tonnage is a little short of the estimates. The Kaslo road was in better condition this month than at any time during the winter, and his teams easily, even now, bring full loads to the wharf at Kaslo. Mr. Hughes has great faith in the future of the district, and is directly interested in mines as well as freight outfits.

OUT OF SUPPLIES.—Work has been suspended on all the mines in Trail Creek district except the O. K. gold claim on Sheep creek. The reason given therefore by E. S. Toppiog, who came up to Nelson on Tuesday, is a lack of supplies. Work will be resumed as soon as the trails are free from snow, which will be in about a month.

IDAHO.

RICH STRIKES.—*Silver City Avalanche*, Apr. 8: We were shown some fine specimens taken from the Ruth mine (one of the Ralph Pool) yesterday, which are almost pure gold and are variously estimated at \$50 to \$100 per pound. They were taken from the adit tunnel, which is over 800 feet in length, and at a point 400 feet below any former workings. The ledge is from three to five feet in width of good millling ore, with a rich streak of almost pure metal from two to four inches in width. A fine body of very high-grade gold rock has been opened in the Oso mine of the Poorman group, at a point 100 feet lower than the former workings. The ore is identical with that found above. The South Central, owned by Gilbert Mikkleson, is taking out some very rich gold ore. Next week we will visit these properties and give our readers an idea of what may be expected, from War Eagle mountain this summer. It has produced millions of dollars, and bids fair to duplicate its record.

MINING MENTION.—The ledge in the face of the Blaine tunnel is now seven feet between walls. In the Blaine stope the ledge is two feet wide, with from four to six inches of \$100 ore. The ledge in the Trade Dollar stope is two feet wide, with from 8 to 12 inches of \$140 ore. A survey will be made within a few days to ascertain the exact position of the tunnel. Another very rich shoot of ore has been encountered in the Black Jack mine. This makes three remarkably rich bodies of ore opened in this property. They are literally buried in ore, and no great amount of work can be done until the mill starts up. Wood is now being hauled. There are some ten men employed in the Phillips & Sullivan mine, and some fine rock is being extracted. We are informed that a good "crushing" is now in the ore house awaiting the opening of the roads.

OREANA OPAL FIELDS.—*Elmore Bulletin*, April 8: Mrs. Linnehan, who has recently returned from her ranch near Oreana, brought here a large collection of beautiful opal specimens found about three miles from Oreana and immediately adjoining the ranch enclosure. Not long since a little boy discovered some very pretty stones in that section and took them home, and upon examination they proved to be opals. Since then these precious stones have been found on Black, Hart and Picket creeks, covering many miles of ground. The specimens which Mrs. Linnehan exhibited to us are of various hues. Some present a peculiar play of colors of delicate tints and others are like the red and yellow of a flame, and still others of a transparent milky appearance. In looks they are superior to anything we have seen coming from the opaline fields. A number of these specimens have been sent to New York to

be tested for their value, and, doubtless, after returne are received, there will be a big rush from this place to the Oreana opal fields, which are only about 35 miles from Mountain Home.

LOWER CALIFORNIA.

ZARAGOSA MINING DISTRICT.—*Lower Californian*, April 5: Mr. J. Dederick was in town this week, and went to San Diego by Thursday's boat. Mr. Dederick has been prospecting in the mountains of Lower California for the last six or seven years. He is now, he thinks, on to a good thing in the Zaragosa district. He has located with his four partners and taken possession of four gold mines, under the names of the Guadalupe, Ahandonada, Tesora and La Fortuna. The Victoria, he also claims, is within his measurements. These prospects are showing up very rich so far as development work has been done on them.

NEW MEXICO.

On Saturday last, Bell & Stephens shipped 206 ounces of gold, the result of a short run of their two-stamp mill at Pinos Altos. The mill is pounding away every day on ore from their claims on the Pacific vein. Another good shipment of bullion will soon be made. One of the best paying properties in the United States, in proportion to the number of men employed and capital invested, is the Inez mine at Cook's Peak. With a working force of from two to nine men, it has paid the following dividends for the last three months: January, \$5100; February, \$1750; March, \$4352. These are net profits after deducting any and all expenses. Work was commenced sinking on the Pacific Company's shaft at Pinos Altos this week. The shaft is 205 feet below the tunnel level, which is equal to about 400 feet from the surface. In the bottom of the shaft there are two feet of good ore. Ore to supply the mill is now being taken from the level above the tunnel and from a level 75 feet below. There are large bodies of ore developed and ready for extraction. The Lone Mountain M. & M. Co., of which John Brockman is general manager, shipped five bars of bullion this week. Under the careful and efficient personal supervision of Mr. Brockman, this mine has become one of the best paying and most reliable producers in the country. J. C. Berry & Co. will ship a carload of high-grade ore from their Georgetown mines to-day. The mines are being worked by leasers to a great extent, the company employing about 10 men on day's pay. The higher grade of ore is shipped to the smelting works, while the second-class is piled on the dump to be milled in the future. The mill will be started as soon as the water question is definitely settled.

CAMP FLEMING.—Peter Mungall and Charles Metcalf brought in a batch of ore yesterday for shipment. The ore was taken from their Gulconda mine, which is located in Treasure Hill basin, about one-half mile north of Camp Fleming. The ore, which is very rich, will be shipped to El Paso. The last shipment ran 391 ounces in silver per ton, and 31 per cent lead. A level has been run 200 feet on the property, and a winze is now being sunk at 150 feet from the mouth of the tunnel. An exceedingly rich ore, with a copper base, was struck at the end of the tunnel. Some of it gave assays of 1032 ounces silver and one ounce gold per ton. John Dodd and Dutch Henry have leased the old Penrose bonanza from Walter C. Hadley. Last week they shipped a sack, weighing 80 pounds, of nearly pure horn silver, which will bring them several hundred dollars. This week they have taken out nearly 200 pounds of similar ore. The ore is found in the debris, and not in place in the solid formation. It was the discovery of a boulder of this ore which produced the great stampede for Camp Fleming in early days, and led to the discovery of the Old Man mine, which has since produced such an immense amount of silver. The original boulder was broken up and sold for over \$3000.

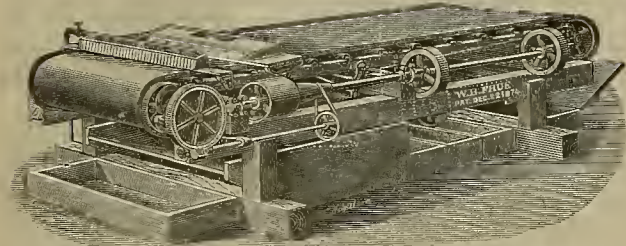
UTAH.

DZAP SNOWS.—*Salt Lake Journal*, April 7: The elements have been "foresight" the mine-owners this season, yet we can see an appreciable increase in the tonnage of ore offered of late on the Salt Lake market. In the Wasatch range deep snows have interfered in mining enterprises, while to the south and west bad roads, as well as heavy snow in places, have retarded the movement of ores from the mines to the railroads. Within a month, however, we expect to see the mining industry in full activity, especially in our lead and copper camps. We expect that Beaver county will come to the front with her mines this year. Of course there is one noted producer in that county—the Horn Silver—which, like the poor, "we always have with us." It is an old standby, and to-day looks good for 20 years to come, as many dividends are exposed to view in her underground workings. We refer especially, however, to the fact that several new producers will, in all likelihood, be added to the shipping list from that region this season.

STRIKE AT BINGHAM.—*Salt Lake Journal*, April 8: Alex. Johnsen, foreman of the Petro mine, who came down from Bingham last night, tells of an important strike made in that property. For some time the company has been at work driving a tunnel from the Cottonwood side of York hill for the purpose of draining the mine and facilitating its working. This tunnel, which is 6x8 in the clear, is in 500 feet. At its face an upraise was started, and at 400 feet a big ore-body was cut yesterday that will run 50 per cent lead, 12 ounces in silver and about \$8 in gold. Connections with the upraise and upper workings will be made in 30 days, when the mine will be thoroughly drained and all ore and waste will be taken out on the Cottonwood side. The company has 500 tons of ore in its ore-house ready for shipment as soon as the roads become settled. It has a good reserve fund in the bank, and is in an excellent financial condition.

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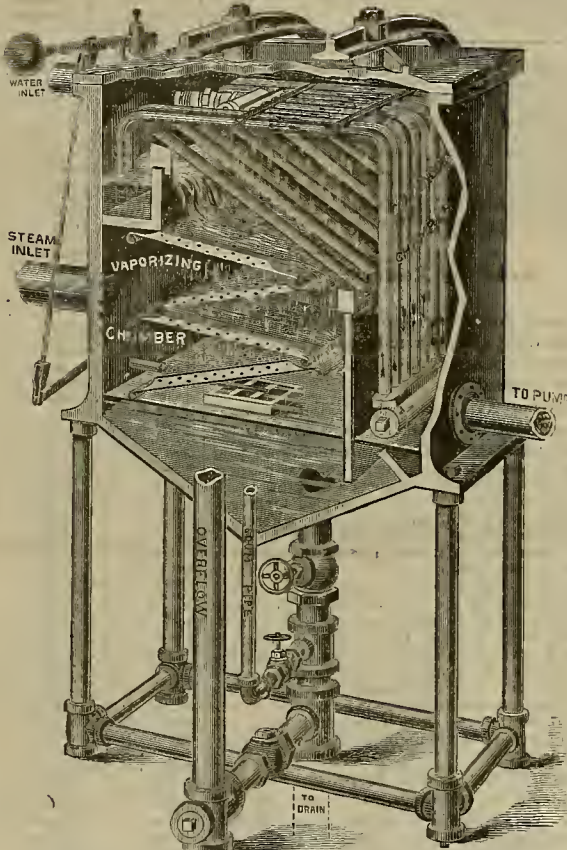
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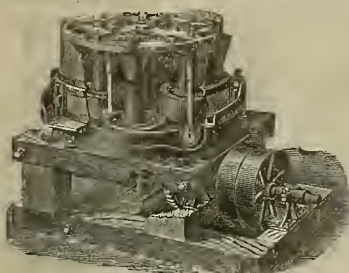
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SAN FRANCISCO, SATURDAY, APRIL 22, 1893.

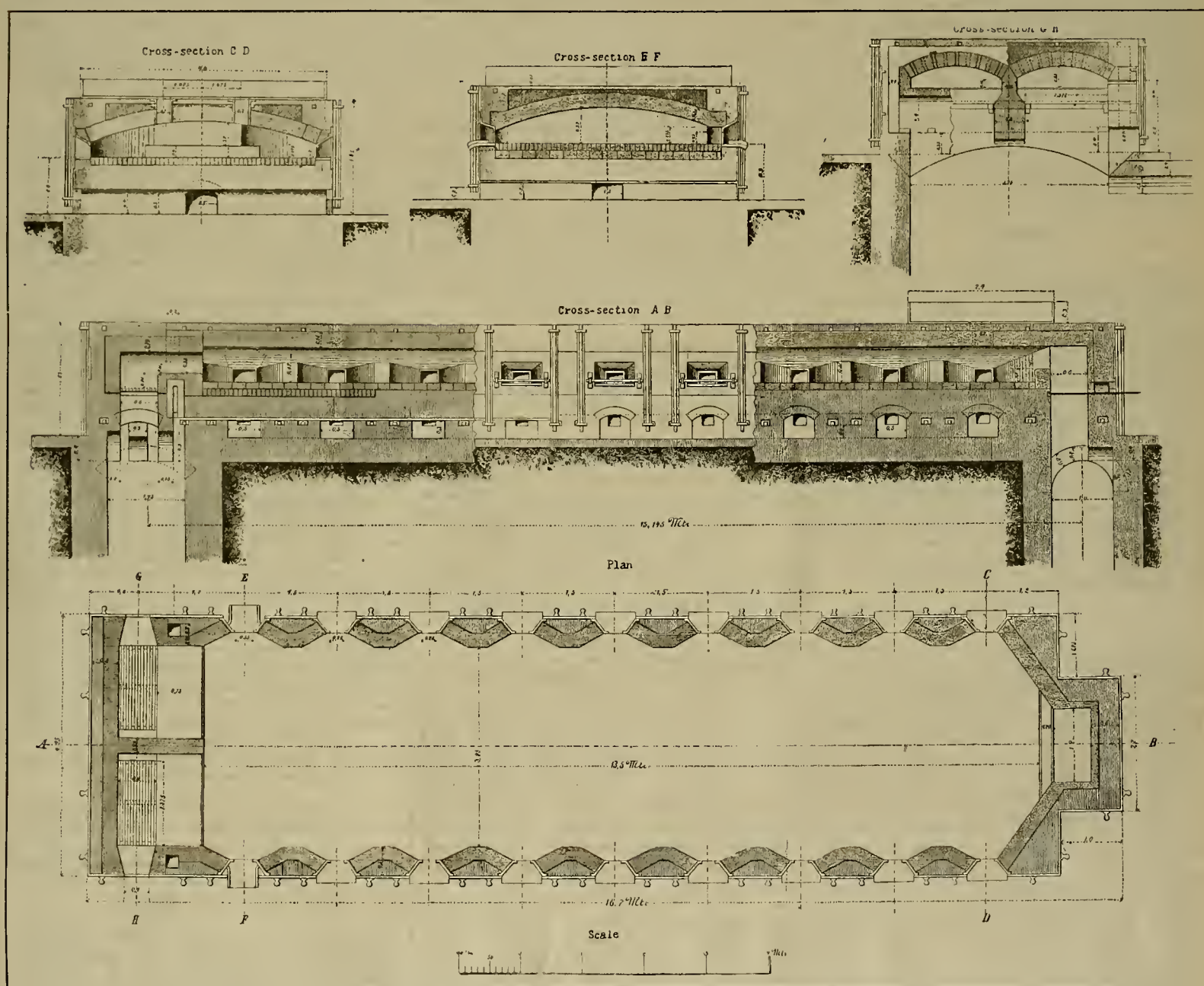
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Lead Ore Roasting Furnace.

California produces between 3000 and 4000 tons of lead ore a year averaging about 47 per cent lead. Inyo county is the chief source of lead ores in California. About 80

dorff, E. M., are a number of illustrations of jigs, furnaces, etc., and among them the modern roasting furnaces shown on this page. It is intended for roasting lead ores. The charge is introduced at the flue end, through two openings shown in cross section *C D*. It is spread over

THE report of the Atlantic Mining Company of Lake Superior for the year 1892 states that the quantity of copper produced was 1852 tons (2000 lbs.), and the cost of production 10.84 cents per lb. (including .27 cents per lb. for construction). The average price realized was about 11.9



A MODERN ROASTING FURNACE FOR LEAD ORES.

per cent of the lead ores delivered at the Selby Smelting Works are sulphides containing some zinc, and often considerable quantities of arsenic and antimony. Extensive deposits of carbonate existing in the southern part of Inyo county and the northern part of San Bernardino county are situated in localities difficult of access, and where lack of water and fuel makes mining and smelting extremely difficult.

In the article on Lead-Smelting in the last published Report of the State Mining Bureau, by P. C. von Peters-

the bed and gradually moved toward the fireplace *G H*, which is separated from the working bed by a hollow firebridge, shown in the plan and cross-section *A B*. The furnace has nine working doors on each side. Through the two nearest the fire-bridge, shown in section *E F*, the roasted ore is raked out.

AMERICA sent the first three months of this year 5191 tons of copper to Liverpool and South Wales. During the same period last year we sent 6082 tons.

cents per lb. That of the Quincy Mining Company of Lake Superior gives the quantity of copper produced at 5552 tons (2000 lbs.), the cost of production 8.77 cents per lb. (including 1.97 per lb. for construction), the average price realized 11.26.

THE hoisting works of the Gold Bank mine, at Forhes-town, Butte county, were destroyed by fire Sunday. W. W. Stow is the owner. The loss is estimated at \$15,000. Seventy-five men are thrown out of employment.

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San Francisco, April 22, 1893.

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Comment.

As soon as the snow is gone from the mountains and the roads get into condition there will doubtless be numbers of men going into the mining regions in search of gold mines. That is, not searching to find new claims, but looking after such as may be purchased. Mining capital is sure to come to California before long and some of it will be with us this summer. Investments will be sought in gold properties by many who have had to give up silver mining owing to the depression in that metal. Miners in California, however, need not expect to be called upon by purchasers who want a mine right off and are ready to pay any price for any sort of claim showing gold prospects. The men who are looking for gold mines now know generally something about mines and are not going to make big investments in 15-foot "shafts" or 25-foot tunnels. They are not hunting for gopher holes, but mines. There are plenty of them here and those who own them will have a chance to sell if at all reasonable in their demands.

Ever since its establishment five years ago, the Cogswell Polytechnic College of this city has been in more or less difficulty, notwithstanding its million-dollar endowment. The college was intended for the promotion of manual training. Troubles arose between its founder and the trustees and the school was finally leased to the San Francisco Board of Education at a nominal rent, its name being changed to the Cogswell Mission High School. It has since cost the city \$20,000 a year to maintain it. As the result of recent litigation the trustees have decided to retire as soon as Dr. and Mrs. Cogswell announce their successors. The college, with its shops, furniture and grounds, is valued at \$125,000. After January next the annual income from the endowment will be \$20,000 for twenty years to come. With this sum it is estimated that the institution can accommodate 200 students free of charge and still have a surplus of a few thousand dollars each year. Dr. Cogswell states that he has now no desire to break the trust, but that he intends to continue and to improve the college. The trustees have not yet been selected and probably will not be until the opening of the term in July. The building of a foundry, the furnishing of the machine shop, and the adding of a varied lot of tools to the blacksmith shop are the more notable improvements attended to by Dr. Cogswell. It is also likely that Latin, German, French, etc., will be abolished from the course of study next term, and that cooking will be added for the benefit of the girls. At present there only some 175 students enrolled, but two years ago there were nearly twice as many. The course of study now pursued is similar to that in the city high schools, with the addition of the manual training. It is sincerely to be hoped that the eccentric doctor will soon carry out his original intention of making this a regular trade

school. That there is a demand for such a thing is shown by the attendance when the institution was first opened.

It is very certain that it will not be long before miners' wages in the other Pacific Coast States and Territories will come to the standard in vogue in California—\$3 per day. It is higher than this elsewhere, but on many mines in Montana, Idaho, Colorado, Nevada and Utah, owing to the low price of silver have closed down, that there are many miners out of work. Moreover these properties can not be worked under present conditions of salaries and wages and will not start up unless a reduction takes place. The miners will naturally object to this and there will be more or less trouble, but the reduction is bound to come before long. We are not urging this lowering of miners' wages but simply stating its probability in view of the condition of the mining industry. To be sure if silver should take an unexpected upward course with any show to remain at its former value the mines would again be worked and pay the old scale of wages. There is no immediate prospect of this however, and the mine-owners are not apt to work their properties for the sole privilege of paying their workmen good wages.

The largest quartz mill in the world is now being erected at the Lanlaagte estate, South Africa. The mill will work 1000 tons a day and is built specially for a MacArthur-Forrest or cyanide process plant. The tanks are 40 feet in diameter and 9 feet deep, having a capacity of 400 tons each. People in this State who have turned up their noses at the cyanide process as not "practical" because it did not work on their particular ore, should make note of this. The Robinson mine, the greatest gold producer of South Africa, has been working 75,000 tons of tailings a year by this process, and making money out of it. Several other mines there are using the system, and now comes this big plant. As the single camp of Witwaterstrand, South Africa, is now turning out more gold yearly than the whole State of California, perhaps its experience is worth something. But people who try to run a chemical process without a chemist, and by mere rule of thumb are not apt to make such a success of it as those who are more systematic and thorough. Of course, we very well understand that there is a difference in classes of ore, and this process is better adapted to some than to others.

At the Mayflower drift mine, on the Forest Hill Divide, they are prospecting a cross or "robber" channel by means of a boring apparatus. A seven-inch hole is bored and piped, just as an artesian well would be sunk. The object of this is to find the center of the channel. There is already a tunnel from which a drift can be run when they find the exact course of the channel and ascertain its center. They are boring a series of holes, the deepest of which will be about 300 feet, it is estimated. The exact course of the channel is undetermined, though its general course within a certain width is known. The boring operations will locate it exactly and there will then be no guess-work in running the drift from the tunnel. This work is not being done on the main Mayflower channel, but on one which crosses it. The result of this work will be looked for with interest. Where boulders are apt to be encountered, this sort of boring is rather difficult, but it seems a comparatively cheap way to prospect, and the wonder is it has not been more frequently adopted.

The San Francisco delegation to the Trans-Mississippi Congress, which meets at Ogden on Monday next, held a meeting this week. The delegation indorsed by resolution the Nicaragua canal and voted down one asking enforcement of the Geary Act relating to Chinese. Ex-Senator Cross introduced a resolution which recited the fact of Congress having passed the Caminetti bill and the California Legislature having donated \$250,000 for the construction of impounding dams when Congress shall have done the same, and in conclusion urged the Senate and House of Representatives to act at an early date on behalf of the mining industry by appropriating the hoped-for \$250,000. In support of his resolution Mr. Cross told of the death of hydraulic mining and the great loss suffered by the State in consequence. He said that gold was in greater demand now than in many years and the financial houses of the world were suffering for lack of it. The miners were eager to get to work without injuring the navigable waters of the State, and if impounding dams were erected all would be well. Of course a Sacramento delegate opposed this resolution; and so did one or two from this city, but it was finally carried, as the mining men were in a large majority. The anti-debris men will finally be forced to recognize the fact that the people of this State want hydraulic mining resumed if it can be done as now proposed. The narrow-minded local prejudice of the valley districts will have to give way in the end and they might as well do this gracefully. The State

Legislature, Congress and the courts have all spoken in favor of the industry within the past six months and anti-debris agitators will soon be out of a job.

Ore Reduction Works for San Francisco.

We have before noted the increase in the receipts by sea at this port of ores from Central America and Mexico. Formerly this was all sent to Europe or to the Colorado smelters, and quite a proportion still goes in those directions, but more and more is sent here every year. The Portland Smelting Company, which is about to establish smelting works on the bay of San Francisco, will probably attract additional quantities of this foreign ore as they propose to furnish exceptional facilities if they can carry out all their plans. There is no reason why San Francisco should not become a great ore-reducing center, except the high freight rates of the railroad companies. Of course they cannot well control the ocean carrying trade in this respect and with additional smelters here the ocean shipment of ores should largely increase.

But with more reasonable rates on ores the smelting works already in operation and those to be established could have all they wanted to do. California ores from the extreme north and extreme south could be brought here as well as those from Nevada and Arizona. The sales are almost prohibitory, and are very high even for concentrates. Moreover, they have a system of charging in proportion to value instead of by mere weight alone, which practically compels miners to work their ores at the claims, not work them at all or give a large proportion of their contents to the transportation companies.

This is an evil which should have been remedied long since. Two years ago a representative of the Portland Smelting Company tried to arrange rates on sulphurets so as to establish a branch here. The railroad companies, however, were not liberal in their policy and the project was abandoned at the time. The works are now to be built, however, and it may be that the railroad companies have seen the error of their ways. Meantime sulphurets from Grass Valley have been shipped as far as Portland, Oregon, to be worked.

With two or more smelting companies in the market for ores, the miners of this State and Nevada should be greatly benefited and many more mines be opened. With ore purchasers ready to buy and make advances, claims could be operated which are now idle, as there are many where there are no reduction works. The Union Pacific has built up an immense business by encouraging the mining industry, but no such policy has been adopted by the companies controlling the California traffic. We are very glad to see that new smelters are to be put up near San Francisco. There is room for others and should be business for both companies. With ores coming both by sea and land, there would be encouragement for men to operate in many old districts which are now very dull.

It seems that Mr. C. P. Huntington, President of the Southern Pacific, after reading a telegram about the establishment of smelting works here, says he will write to the railroad officials in San Francisco to take ores at any price that does not cause an actual loss on transportation. That sounds like business and it is to be hoped he will carry out his idea. The action of the road in the past has not been in the direction of cheap rates on ores by any means. Their plan of charging by value of the ore shipped has prevented richer ores coming here, and poor ones would not pay to ship. If Mr. Huntington has at last had his eyes opened to the evils of this policy, it will be a good thing for the mining industry of this coast.

THE State Miners' Association has sent as delegates to the Trans-Mississippi Congress, Sam K. Thornton (with Chas. G. Yale as alternate), and Julian Sonntag (with T. L. Ford as alternate). Several other members of the association, including C. W. Cross and Robert McMurray, have also been appointed by the Mayor.

MR. FELIX CHAPPELET, of the Mayflower mine, Placer county, who has been confined to his home with erysipelas, is now on the road to recovery. His illness was brought about by striking his head on a timber in the mine, and he was at one time very ill.

THERE were 22 cases of ores and minerals, weighing 2500 pounds, shipped to the World's Fair from Grass Valley last week. There are many rich specimens in the collection, but most of it is milling ore, representing that being daily worked in the mines of the district.

A CONTINUANCE of the agreement for restricting copper production until the end of this year has been practically arranged between large European and American producers.

Progress of Mining in New Zealand.

Dr. A. Scheidel, of Auckland, New Zealand, arrived here on the last Australian steamer on his way to the World's Fair, with credentials from the governor of the colony. While here he will make a study of our metallurgical and mining operations. He left for Grass Valley on Wednesday, and will afterwards go to the Comstock before going East. Dr. Scheidel is the manager of one of the largest of the New Zealand mining companies, the Sylvia, at which place he has made a special success with the cyanide process, treating large quantities of concentrated sulphurets and obtaining a very high percentage of the gold. He is an enthusiastic believer in the merits of the MacArthur-Forrest process as applied to refractory gold ores, his success with it at the Sylvia mine leading him to believe that it is the most important metallurgical improvement of the age. In an interview with Dr. Scheidel we obtained the following information concerning the mining industry in New Zealand:

New Zealand offers many facilities which very few other countries possess, as mineral and metalliferous ores are distributed throughout the colony. The reef regions near the west coast of the southern island and the fields and district of Auckland are densely wooded and well watered. The alluvial drift on the southern island commands an ample water supply. The larger rivers are used to supply motive power for mining machinery, and in those districts where no water power is available, the rapid current of creeks at a distance is used for the generation of electric force, which is transmitted to such places less favored by nature. An instance in point is offered by the Skippers mine in Otago, where a 30-stamp battery and all additional machinery is driven by electricity transmitted over a range upward of 2500 feet high for a distance of two miles. Electric power is used in other instances for working dredging machinery. For instance, in the Shotover river, their gold-bearing gravel is lifted by power generated at a distance of 1½ miles from the dredger.

The mineral wealth of New Zealand is very considerable, and its resources are not at all developed as they deserve to be; but it must be confessed that all efforts are being constantly made to take advantage of new scientific discoveries and improvements in machinery, and, with the help of concentrated capital, the mining industries of the colony would soon reach that stage of prosperity which the natural conditions prognosticate. The mining industry has suffered in consequence of the failure of companies, which spent all their money in the erection of plants before thoroughly prospecting their ground, so that the prosperity of the mines became impossible when an income was most important. The title to claims should be made more secure for the bona fide holders.

Gold is being found all over both islands, in alluvial drift in the southern provinces, on the west coast of the middle island, in the reefs of the west coast of the middle island and in the mining districts east of Auckland where the country from Cape Colvill to Te Aroha for an extent of eighty miles is gold bearing. The famous Thames gold field is situated there. Its fame once spread all over the world and it is only necessary to quote the Caledonia mine which produced in one year £1,000,000 worth of gold to recall those early days of the field when 20,000 men were occupied in carrying on the operation in a very small area which rivaled in wealth the most famous gold deposits. The Thames field has during the last few years been diminishing in gold production, but such excellent plants as that of the Sylvia where concentration and treatment of the concentrates by cyanide is carried on on a large scale, and the prospecting of the lower levels, will again place the Thames field among the large gold producers of the Australasian colonies. New fields are constantly reported in the upper Thames district, and there can be no doubt that the Hauraki gold field will have a splendid history of which the present results are only the opening chapters. The gold production of New Zealand amounted in 1891 to 251,000 ounces of a value of £1,007,172. This is the largest output since 1880. The returns this year will be considerably larger in consequence of large plants commencing work on the rich quartz lodes.

The total gold entered for exportation up to the end of March, 1892, amounts to 12,131,583 ounces, of a value of £47,679,191, and, beyond doubt, a considerable amount has been taken out of the country without authorization, so that the total value since 1852, when gold was first found by C. Ring, an old California miner, would far exceed that figure.

Silver has been found in all the goldfields of the colony. The gold of the fields of the north island contains a large percentage of silver. The gold at the Thames and Cromandel contains between 25 and 33 per cent of silver, and varies consequently from £2 13s to £3 per ounce. The banks separate the silver from the gold by the Miller chlorine process. The total export of silver up to the end of 1892 amounts to about 600,000 ounces, of a value of £140,148. Of late a large number of silver lodes have been found at Puhipuhi, but the prospecting and working of all the fields have been carried on with very little energy. The methods for silver extraction at disposal proved unsatisfactory. The Government should always help any industry when difficulties arise. A flourishing field does not need any assistance, but everything should be done to help bring matters to a satisfactory issue if technical difficulties arise. No systematic mining has been carried on in either district where silver lodes are found.

Copper ore has been found and worked in many parts of the colony as far back as the earliest times. Prospecting is still being carried on with success, and the colony may one time take its place among the copper-producing countries. The total value of copper exported up to the end of 1891 amounted to £17,866.

Antimony is found together with gold and silver in

many of the quartz lodes, chiefly at Ruhihubi, Thames and Te Aroha, but no attempts are made in these localities to turn it to profit. A large antimony lode is being worked at Endeavor Inlet, and deposits of some magnitude have recently been discovered north of Auckland. The total amount of ore and star antimony exported from the colony up to the end of 1891 was 2786 tons, representing a value of £41,140.

Manganese ore, chiefly per-oxide, is found in many places and has been profitably worked for many years. The total value exported up to the end of 1891 amounted to £53,925, representing 16,456 tons.

Chrome ore is found in the district of Nelson, but no work has been done there of late. The lodes are well worth further prospecting. The value of the ore exported amounts to £37,367.

Lead is being found in the form of galena, particularly on the Hauraki fields, in combination with zinc blend. No attempts have so far been made to turn it to profit, but opportunity may offer itself in consequence of an extended introduction of concentration.

Iron is found in very large deposits in various districts and forms. The beach between Manukau and New Plymouth is covered with impure magnetite. Brown iron ore is found in the district of Auckland, and magnetite and hematite ores in large deposits at Dunston, in Otago, and at the Dun mountain in the province of Nelson. There is an enormous deposit of hematite at Parapara, in the same province. There is bituminous coal at a distance of a few miles, and large deposits of limestone adjoining the hematite. All such deposits are within a mile of the ocean beach, where large vessels could be loaded after the construction of wharves. Large iron works with Hohovens, puddling furnaces and a rolling-mill are erected at Ouchunuga, near Auckland. It is to be regretted that more judgment has not been exercised in the erection of such a splendid plant by selecting a more suitable location for procuring the raw material at low cost, and it may prove still advisable to shift the whole plant to the Nelson district, where the facilities are more of a nature to make the industry a financial success. There is no probability of competing in the world's market, but there appears to be a splendid opportunity for well-managed works to supply some of the Australian colonies with a greater part of that useful commodity. To make use of the magnetic oxide of iron sand found on the beach near Manukau and Taranaki for the manufacture of iron will hardly pay at present, as that sand must first be brought into suitable form for smelting, which procedure demands practically the making of an artificial iron ore, a process which hardly recommends itself as being a suitable one if high-grade ores are found in such favorable situation as is the case in the Nelson district. Small samples of iron made from such sand appear to have given satisfaction otherwise.

Cinnabar is being found in many localities, but up to date nowhere in such quantities as to be of commercial value. The Bay of Islands district gives indication of large deposits being near, as the black mud near the hot pools at Ohaeawai contain small globules of mercury and give the usual indications of ore deposits.

Tin has been found in the south of Stewart's Island, but no financial success has so far accompanied the attempts to work either the gravel drift or the lode in the remarkable ranges.

Mineral oil is found in various places on the North Island and on the sea beach at New Plymouth, also in the neighborhood of Gisborne. Several bores have been put down as deep as 1700 feet but yielded no continuous supply. Of late a mineral oil lease has been taken up about twenty miles from Rotorua, and the results are being looked forward to with interest.

The bituminous coal measures of New Zealand are of very great extent, and the coal, especially from the west coast of the middle island, is equal to the best anywhere. The output of coal, which amounted in 1878 to 162,218 tons has increased in 1891 to 668,794 tons. The deficient state of the harbors on the west coast interferes with the exportation of coal, but the works now in construction will offer such facilities as will increase the export. Some bituminous coal is being found in the north of Auckland, in the Bay of Islands and near the banks of Waikati river. It is useful for domestic purposes and some local industries. The total output of all sorts of coal since records have been kept amounted in 1891 to 7,131,196 tons. New mines now being opened will still further increase the production, and after suitable wharf facilities are provided the coal mining industry will become one of the most important of the colony. It may be mentioned that H. B. M. Calliope steamed out of Samoa during the disastrous hurricane, using Westport coal; and that Sir John Goode declared in his presidential remarks addressed to the Institution of Civil Engineers in London, that the bituminous coal found on the west coast of the middle islands of New Zealand is considered by engineers to be fully equal if not superior to the best description from any part of the world.

Kauri gum may be mentioned among the mineral products of New Zealand, since, although originally a product of organic nature, it may be spoken of here on account of its fossilized character. The gum is obtained only in the northern portion of the northern island, and in no other place. Some gum is exported from New Caledonia, of seemingly equal appearance, but of an inferior quality and of small value. Kauri gum is the product of kauri forests which long since became a thing of the past. The gum was formerly found near the surface, but is now being obtained from below by digging, or in some districts and localities by plowing. The gum is used principally in the manufacture of varnish. The United States is among the principal consumers, and it would seem that the export duties should be taken off this useful product. Upwards of 5000 men are employed in the gum fields. Digging gum has been a great resource for many men who started in life in the colonies under good auspices, and it has been a great help to the district of Auckland when the colony suffered under financial depression. Competent persons

estimate that the gum deposits will last for 50 years to come, but it is hardly possible to form any exact idea. To show the importance of this gum industry, it may be mentioned that the total production up to the end of last year amounted to upwards of 150,000 tons, of a probable value of £650,000,000 sterling. The export in 1892 amounted to £480,000.

In reference to the metallurgical features of New Zealand, it may be said that the colony has been for years the peaceful field for inventors and introducers of processes for the saving of gold and silver. Not all of the processes which have been introduced in the colonies have been successful, but each one has done some good by diffusing knowledge of matters and machinery among the mining population. The battery used on the fields of the North Island are of the latest designs. Large plants for dry and wet crushing are found on the Hauraki field. The special feature of the gold and silver metallurgy during the last year has been the introduction of concentration plant and extraction with cyanide of potassium, commonly called the MacArthur-Forrest Process. The Sylvia Gold and Silver Mining Company at Taranu erected some years ago a concentration plant on the so-called German plan. The ore of that company is of a complex character and contains a high percentage of galena. It became therefore necessary to make slime concentration a special feature of the plant. The company added about a year ago an agitation plant for treating the concentrates with cyanide of potassium. The results have been in every respect satisfactory in the extraction of about 96½ per cent of the assay value the ore. Other mines have adopted the same process for extracting the raw ore by means of what is called the percolation process, and indeed it seems that the gold ores of several districts, like those of Kuotuna and Karangahake, are particularly suited to such treatment, as they contain gold in a very finely divided state. It is my opinion that the cyanide of potassium process is the most important addition to metallurgical knowledge of gold extraction and by the general adaptation the output of gold will be vastly increased. I am, of course, aware that in the few things I have told you about the mineral industries of New Zealand, I have not given anything like an exhaustive description, but a fair general idea may be gained.

Coast Industrial Notes.

THE telephone line that is to connect Hanford and Fresno is nearing completion.

IT is reported at San Bernardino that the Harqua Hala mines in Arizona, owned by Hubbard and Bowers were sold Wednesday for \$1,000,000.

THE force at the Mare Island Navy Yard at the present time is larger than it has been for many months past, 650 men of all branches of labor being employed.

THE building of the Los Angeles Times is now lighted by electricity furnished by its own dynamo. The lighting plant is operated by the same engine that runs the press.

SANTA CLARA pays \$9000 per annum for water and \$3000 for light, which causes the Journal to urge the town to become the owner of the water works and an electric-light plant.

THE irrigation company said to be backed by \$8,000,000, to bring the desert under cultivation in the Valley of New River in eastern San Diego county, has begun operations by putting a large surveying party in the field.

THE Oroville Mercury is urging the formation of a co-operative company there to erect a fruit cannery. The growth of deciduous fruit orchards in the vicinity of Oroville the last five years has been almost phenomenal.

DAVID POWERS, who owns a farm at Blue Lake near the depot of the Arcata and Mad River R. R. Co. has found coal on his place. He had spent some money prospecting, but a big landslide a few weeks ago revealed what he considers a large body of coal.

THE Vance sawmill at Eureka, Humboldt bay, will run nights as well as days hereafter to fill orders on hand. This will make the output of the mill over 80,000 feet of lumber daily. The prospect for a very active season in the lumber mills at Humboldt is bright.

THE Harbor Commissioners at their meeting decided to raise the monthly rental of the big coal bunkers at Valjejo-street wharf and the adjacent seawall lot, which were lately purchased by Goodall, Perkins & Co. from the Oregon Coal and Navigation Co., to \$200 from \$62.50 a month.

SAN DIEGO voted by a majority of nine to one to issue \$665,000 in bonds for the construction and ownership of a system of water works. That city has long suffered from an inadequate water supply, and so when the people were given a chance they made their expression of a desire very emphatic.

THE White Pine News says: Several letters have been received by the News office during the last week from people who wish to come here to look for work. To all such inquiries we can only say: There is no work to be got here at the present. As soon as there is, the News will make a note of it.

THE town of Haywards was recently reincorporated so that an elaborate sewer system could be established. County Surveyor Nusbaumer has submitted plans for a system which the trustees are now considering. The drainage is to be in the Bay of San Francisco, and the total cost, for which bonds will be issued, will be about \$25,000.

THE bids for the new crane for the stone drydock at Mare Island having been found by the department to be greatly in excess of the estimated cost new bids are asked for, to be opened the 6th of June. This will give the San Francisco works an opportunity of putting in their bids. The crane is to be completed within fifteen months after the contract is let.

A MEETING of the executive committee of the Traffic Association of California was held Tuesday. A resolution was adopted endorsing the scheme of the Merchant's

Freighting Association to raise a guarantee fund for the establishment of a competing line of coastwise steamers between San Francisco and Redondo and San Pedro. A guarantee fund similar to that used in starting the line of clipper ships is wanted.

OVER & NAGLE, sub-contractors for the building of the new 19,000,000-gallon reservoir for the San Diego County Flume Company, this week sent a number of men to the reservoir site, where the iron pipe and flume proper connect. Work was stopped some weeks ago for lack of material, but will now be pushed to completion, which will take some two months more. The reservoir will contain an extra supply for the use of San Diego.

A PRIVATE MEETING of ship-owners was held Wednesday and it is understood that they are about to make an agreement with boarding-masters to have them furnish crews throughout the coming summer. Men for deep-water vessels are to be furnished for \$20, for island vessels at \$25 and coast and lumber vessels at \$30 per month, which is a general reduction all through. This will throw the business into the hands of the boarding-house men almost entirely.

The unemployed workmen of this city have presented to the supervisors a petition for relief, and point out several methods. One is to raise \$100,000 by subscription to employ men in the Golden Gate Park. Another is to spend money in improving the sanitary condition of the city and spending \$500,000 in cleaning up. The third proposition is to improve the Panhandle extension of the Park by day's labor. The supervisors have the matter under consideration.

THERE is again talk of an opposition ferry to Oakland, this time it is for freight service only, and the projectors are the Whitney Transfer Co. A steamer has been secured and is now being overhauled, and in a few days it will be christened "The Whitney Transfer." There have been 2000 shares of stock issued at the par value of \$50 each. The opposition boat will commence running about May 1st, when all the merchants of Oakland will be asked for patronage.

THE lathers of Oakland are trying to raise the prices of their labor. Lathers now receive \$1.25 per 1000 laths. It is claimed that at this rate the best men can make but \$1.75 a day. They want an increase to \$2.25 per 1000 laths. At this rate the best men could not make more than \$3.50 per day, while the average man would receive about \$2.75 per day. The men also make the further claim that they only work on an average of four days a week the year round, and the new rates will only allow them a fair living.

LOUIS SLOSS, John D. Spreckels, James B. Stetson, George C. Perkins and W. F. Whittier have petitioned the Supervisors of San Francisco for a franchise to lay down and operate in this city underground conduits with the wires or other conductors to be contained therein for the transmission of electricity for telegraphic, telephonic and other purposes for which electricity may be used to transmit intelligence by signals or sounds. The privilege to make all necessary connections to subscribers is asked. The franchise is for a term of 50 years and \$50,000 is to be expended during the first year. The city is to have the free use of the wires for police and fire-telegraph service.

THE number of vessels leaving this year to salt down salmon is on the increase. Last year the salt-salmon pack in Alaska, outside of the canneries and fresh fish put up in cans, was very large. The whole catch, however, brought good prices. The combination among most of the Alaska salmon canneries and the limit of the pack in cans has opened a demand for salmon salted in barrels that has encouraged a great many to fit out small craft for fishing trips north. The sending to Bristol bay last week of the three-masted schooner Mary Dodge was a notable event in salmon fishing for salting down. The Dodge had 1600 empty barrels and 14 tons of rock salt. Each of the 12 fishermen shipped on a lay of 7 cents a barrel or \$112 for the trip, provided each one of the 1600 are filled. They are of course found for the trip and their return depends upon how well the salmon run in Copper river and Bristol bay this year.

THE Oakland City Council, the other day, considered the application of the Twelfth-street Electric Railway Company for an extension of time for completion of the road, and granted it, but added as conditions that the company must run electric lights, one to each two blocks, and must stand the expense of widening Pine and Wood streets by narrowing the sidewalks. The attorney for the company protested against these conditions. Finally the company went ahead and rushed the work so as to get the road in operation by the terms of its first franchise. It set up the poles, rigged temporary wires, borrowed two cars, got the current from another company, and triumphantly ran their two cars over the road before its original franchise expired, thus evading the added conditions of furnishing street lights and widening a street. It was very rapid work indeed, there being only a few days in which to do it. The road will now be put in permanent order and continue running.

AFTER being in business for over 20 years, the Huntington-Hopkins Company intends dropping a very important branch of its trade. The firm has sold to George W. Gibbs & Co. its sheet and bar iron business. The reason assigned for this partial retirement is that it does not pay for the capital invested in it. In the days when the company, having already established its hardware business, decided to add a sheet and bar iron trade, profits were larger than they are to-day, and competition was less. The firm believes that one branch of the business is quite enough to attend to. The stock of iron and the good will have been disposed of, and the large quantities of material stored in the big building south of Market street, running through from First to Fremont street, will be turned over to the purchasers. Most of the large manufacturers now have their own agents in this city, so that the sales of sheet and bar iron by those in the ordinary hardware business are comparatively small.

Uniform Currency.

TO THE EDITOR:—In a former letter, on "Money," I have suggested that a given quantity of precious metal may be made the perpetual basis of a corresponding volume of sound money, that is, by the State purchasing the metal, paying notes to an equal value, and keeping it. Under such a system there would be many advantages, some of which were pointed out, and if any person should prefer to hold his wealth in the form of precious metal, he could buy gold or silver bullion for the legal tender notes, and reconvert it at pleasure, with a trifling sacrifice to compensate the labor involved. I now propose to show how simply and easily the volume of currency may be maintained and its unit made nearly uniform, as a means to the exchange of service. For the sake of clearness, I will suppose gold to be the metal selected as the chief basis of the currency, with silver as an admissible auxiliary, a "good second."

Toil, labor, service, hence values, may be measured by means of any concrete product of toil. Many different substances have been and are used in different parts of the world and at various epochs, salt, codfish, tea, and silk among the number, and such things have at least this advantage over gold and silver that, if one cannot spend one's money, one can yet make use of it. I have been in places and circumstances in which a pound of codfish would have been worth more than a double eagle to me.

But perishability is a serious objection to the use of those things as money, and although brass, iron, lead, copper, tin and bronze are on record as having been coined, the preference of nations has generally been for gold and silver, the least destructible of the metals, except platinum which is too scarce. Gold is in demand all over the world. Why this is so, I leave to the fishers to explain; but the fact is the reason why gold seems to be the best standard of values in concrete form. The value of an article depends not upon what it has cost to get, but upon what it would cost to replace, coupled with the desire to have, for it is clear that, if gold could be got for nothing, no one would give anything for it, no matter how much it might be in demand, nor how much trouble its getting might have cost previously, and if no one should want gold it would be worth nothing, however scarce and hard to get.

Though gold may be used as a standard, it does not follow that it must be coined and used as money. As I have said before, it is an imperfect standard because its own value fluctuates. This imperfection may be corrected.

Let the unit of value be \$1. Let that unit of value equal the unit of toil, and let that unit of toil, and therefore that dollar, be represented by a certain fraction of an ounce of gold. But the value of the ounce of gold, that is, the number of units of toil that it represents, varies according as gold is easier or harder to get, hence the weight of gold to represent and equal the unit of toil, and consequently the unit of value, the dollar, must also vary. In other words, let it be decided at a given date that a given weight of gold represents one dollar, and thereafter change that weight as gold may appreciate or the reverse. This plan might be objected to on account of the disturbance and cost of recoinage; but why recoin or coin at all? Let the gold be paid for with legal tender notes and remain in the treasury, as is now done to some extent with silver.

When, at suitable intervals, the notes should be called in for replacement by new notes, let the weight of gold to the dollar be readjusted in conformity with the commercial value of gold, issuing a greater or less number of the paper dollars and giving to each person turning in notes a corresponding percentage of increase or decrease. During the intervals between the readjustments prices would rise or fall as gold might fall or rise, but the readjustment would restore normal prices and the variations would not be very serious in a period of five or even more years, or a special readjustment might be made when necessary to maintain the approximate immutability of the dollar.

During the reissue of notes, in case a readjustment had occurred, there being two kinds of dollar notes extant, the old and the new, both of which could not properly be legal tender at the same time, a time must be set after which the new issue would be the only legal tender, the notes being ready for delivery at suitable places in exchange for old notes representing an equal weight of gold (not each dollar but in total sum). At the same time all debt and credit accounts must be corrected by a percentage corresponding to the change in weight of the gold dollar—a simple operation and not required very frequently. Each issue of notes should be distinct in color and design, and should show the date of issue and the weight of gold to the dollar.

The system could be made to so regulate the gold market as that fluctuations would be minimized, while the volume of the currency could be kept at a nearly uniform amount *per capita*. This would be done by the Government buying or selling gold bullion, always giving or receiving notes in exchange, and with a small discount or premium, as might be necessary. It will be seen that appreciation of gold would increase the volume of currency in a new issue, and selling gold for notes would decrease it; that is, the amount in the hands of the people would decrease. If gold should fall, the volume of currency would be decreased in a new issue, and the treasury would buy gold for the notes not paid out for old notes. Account would have to be taken of the increase of population between the re-issues.

As the quantity of gold procurable would not suffice to cover the required amount of currency, other kinds of wealth could be used to supplement it, and no doubt silver would be the first choice; but whatever the metal or other substance, it should be bought and sold for notes only. The precious metal required for foreign payments could be sold in the form of fine bars instead of coin.

As to knowing whether gold has changed in value during any given period or not, I think a committee of suitable men could decide by a survey of the general market for commodities, labor, rents, etc., and if the re-adjustment of the dollar should not accord accurately with the gold market,

it would approximate, and prices would readily adjust themselves. In fact the people would not trouble themselves about the value of gold, except those who might require to deal in it.

Under this system, gold, though the standard, would have a price, in dollars, varying with each re-adjustment of the dollar, the ounce of metal being always worth as many dollars as would be required to represent an ounce of gold. Thus, if the dollar note should represent the twentieth of an ounce, gold would be worth \$20 an ounce; if a twenty-third of an ounce, gold would be worth \$23 per ounce (with slight variations to cover the labor of exchange).

Well, *qui bono*? This; debtors and creditors would be protected, as nearly as possible, from injury by a rise or fall in the exchangeability of gold for other products of industry; the volume of currency would be maintained at a nearly uniform proportion to the population; the market for precious metals would be steadier; the prices of goods, wages, rents, and assessments for taxation would rest on a more nearly stable basis than now, and their proper fluctuations would be visible and intelligible, as would also those of gold; we should have a uniform, simple and sound national currency, with fewer men getting rich from the toil of the masses, and less absolute loss of gold by abrasion and by accidents.

Another advantage would be that the man who should turn in notes, either for new notes or for bullion, would not have to suffer a loss on account of light weight. This matter of light coin illustrates the distinction which Herbert Spencer makes between "absolute ethics" and "relative ethics." In strict justice, the honest man who turns in worn coins which he has received at their face value ought to receive that value in new coin; the loss ought to fall on the community; but this cannot be admitted in practice, since many would purposely abstract gold from the coin, by chemical or mechanical means, in order to make dishonest gain at the expense of the community. The use of notes avoids this difficulty.

We have now about two thousand millions of dollars in various kinds of money, or near \$34 for each inhabitant; to keep up this ratio we must add about three millions per month, on account of the increase of population. But fractional currency might be made, as now, of metal, to avoid the need for a multitude of small notes, and because coin would be more convenient for the purpose; the intrinsic value of such money is not of great importance practically.

The proposed plan is a compromise between the barbarism of coin and the dangers of a currency of "credit money." In a future letter I propose to show in a very simple way, without going back to the dawn of creation, the reason why the currency, though it may consist of paper notes, must have a tangible backing of some sort. We must make up our minds to endure some slight inconvenience until we shall be civilized enough to adopt *The Ideal Currency* in the full sense of the term. I do not expect to see my suggestions adopted, probably they would require modification; but if they have in them the germ of good, that germ may fructify in the course of time.

C. H. AARON.

Losses in Dressing Tin Ores.

Mr. James Hicks, in a paper read before the Mining Association and Institute of Cornwall, referred to the losses that have always occurred in the dressing of tin ores. In early days, when Cornwall tin mining was confined to the upper horizons, the black tin occurred in comparatively coarse crystals, and it was thought proper to crush the ore coarsely, but in the lower levels now being worked the finely disseminated mineral requires a finer crushing to liberate it from the gangue. As a consequence the screens employed have become finer and finer, until now they are No. 35 or 36 B. W. G. This finer crushing has increased the production of slimes, as have the pulverizers employed. The old methods of jigging and buddling were unable to save a high proportion of this, and as a consequence other appliances were employed, but the works are far from perfect, as may be imagined from the statement that nearly 50 per cent of the slime tin is lost in dressing.

The mines on the Carn Brea Hill, which include Dolcoath, Cook's Kitchen, Carn Brea, East Pool and other famous mines, whose tailings flow into the Red river, produced in the aggregate 7558 tons of black tin in 1890, and 8234 tons in 1891. The stream-workers on the tailings of these properties sold in 1890, 1302 tons, valued at £52,080; but in 1891 their output fell off to 879 tons 16 cwt., owing to the improvements made in dressing works, notably at the Tincroft, Carn Brea, Greeville and East Pool mines. In 1890 the tin caught by the stream-workers was 17 per cent in weight, and nearly 13 per cent in value of that produced at the works, and when it is considered that the methods employed in working the tailings are extremely simple, it is safe to say that the 405,000 tons tailings which flow into the Red river carry 20 per cent of the original contents, or about eight pounds to the ton of black tin, are lost to the mines. In the aggregate, this is a large amount—over 1000 tons of black tin annually—valued at about £100,000. But if these results are to be considered poor, those at the mines whose tailings flow in Portreath river are still worse. These mines, which include Wheat, Basset and West Basset, produced 1247 tons 13 cwt. of black tin in 1890, and in 1891, 1279 tons. The river-workers did nearly as well as the miners apparently, as mining and crushing had been done in advance, and produced in 1890, 428 tons of black tin, and in 1891, 330 tons, an average of 33 per cent in quality of that produced at the mines, and 25 per cent in value.

SUPERINTENDENT GILLINGHAM has just received a telegram from the home office in New York that the contract has been let to put in a hundred-stamp mill at the Phoenix mine, Arizona. The work will be done at once, and it will make the mine one of the best-paying in the gold-belt property.

Demands of Labor Unions.

A general strike of mechanics employed on the Exposition building at Chicago and its utter and complete collapse have been the chief incidents of the current week. In this strike the trades-unions came for the first time into direct opposition to the general Government, and were knocked out in a single round. Before this work of building at Chicago began a conference was held between the Fair managers and the trades unions to arrange and define the terms upon which the labor should be performed. The unions presented four demands, namely: (1) that eight hours should be a day's work; (2) that minimum rates of wages should be fixed; (3) that all differences should be settled by arbitration; and (4) that only union men should be employed. Of these four demands the Fair managers acceded to but two, namely, the eight-hour day and the arbitration of differences. They declared their purpose to pay full ruling wages at all times, but declined to enter into any engagement as to rates, and declined to discriminate between union and non-union men. After some parley these terms were accepted, the understanding being that the compact was to govern during the whole of the construction period; and under this arrangement the work has in fact gone on until Monday of the current week.

Although prodigious things have been accomplished at Chicago during the past year, there is still much to be done, and it has for some days been a question if, in the short time before May 1st, the buildings can be put in shape for the formal opening which the law says shall occur on that date. The trades-unionists saw in this situation a chance for which they have long been watching, to exact from this Government a definite, official recognition. In disregard of the original compact with the Fair managers, they made a demand on Saturday last that no non-union men should be taken on the work, and when this demand was refused they applied under the terms of the compact that the matter should be settled by arbitration. The Fair managers flatly refused, holding that the agreement to arbitrate related to disputes arising under the compact but not to a proposition to alter the terms of the compact. The soundness of this view cannot be disputed. If a "difference" related to wages, hours of labor or to matters of discipline had arisen, then the managers would, under their compact, have been bound to arbitrate; but when this "difference" was a proposition to change the compact itself, it became a very different matter.

The unions insisted upon their demands and on Monday, in obedience to orders from "walking delegates," between four and seven thousand carpenters and painters, not one of whom had a personal grievance of any sort, left their work. It was imagined by their leaders that the necessity of having the buildings in order by May 1st would force the fair managers to make concessions but they soon found that no concessions would be made. It was announced that the vacant places were open to all comers and some hundreds of non-union men soon appeared and were set to work. Arrangements were also made to bring in workmen from Joliet and other near-by cities to fill the places of the strikers. The trades-union men stationed committees at several gates leading to the fair grounds and sent other committees to meet the trainloads of incoming mechanics, and persuasive efforts were made to keep them from going to work, but it was without effect, and before night it became evident that the strike was a failure. Furthermore, the leaders began to realize that in offending against the fair managers they were antagonizing the United States Government, and the people of the United States as well; that the work upon which they had been engaged was a matter of national concern, and that it would be no slight thing to assume the responsibility of preventing its completion. It was realized that the unions would, by delaying the fair buildings, create more enmity than could be overcome by ten years of legitimate proceeding. Haste was made to confer with the fair managers and to withdraw the demands that had been made and on Tuesday morning the whole force went to work as usual, as if nothing had happened.

The real motive of this strike was to compel the Government to "recognize" the trades-unions, and the real significance of its failure is the firm opposing stand taken by the agents of the Government. By this incident the line is definitely drawn on the part of the Government against the proposition to concede to private organizations the power to make the industrial laws of the country. The impudent demand of the unions that the Government of the United States shall, in the employment of labor, discriminate in favor of one class of its citizens as against another class—and this is just what the protest against non-union workmen at Chicago meant—has been answered by flat denial. The sound ground has been taken that to make such concession would be a shameful surrender of responsibilities which the Government owes to its citizens. The Government owes to every man protection in his right to labor upon such terms as he may choose to make, and the action of the authorities at Chicago was in line with this just principle. To have accepted the terms proposed by the unions would, practically, have been abdication of a duty as sacred as any in the whole range of governmental responsibility.

The arrogant assumption of the unions of the right to fix the conditions upon which men may or may not labor would, if allowed, establish the enactments of the unions as superior to the enactments of Congress itself; and it would be a form of tyranny as oppressive and infamous as any which ruled in the dark ages of universal despotism.

Application of these principles to local and personal affairs will assist in their just comprehension. Is there a farmer in California who would not resent an authoritative dictation on the part of his hired men as to whom he should or should not employ? Is there a farmer who would tolerate the interference of a committee of farm hands who sought to make him discharge a man who was

willing to work upon agreed terms, and whose work was satisfactory? Is there a farmer or fruit-grower who would not feel that he was badly used if his help should quit work in the crisis of harvest-time because he employed other laborers who were not of their particular set? Is there a farmer who would allow a "walking delegate" to impudently "nose" about his fields, barns and dwelling for the purpose of hunting out and aggravating subjects of dispute between himself and his men? On the other hand, is there among the thousands of ambitious young men who, as "hands" on California farms, are laying the foundation for future independence, ones who would give over to a "committee" or a "walking delegate" the authority to regulate his conduct in all his relations to his employer? We hope not. The system of the trades-unions, which makes a few "leaders" impudent tyrants and makes the vast body of workmen scarcely better than slaves, finds little favor, we are glad to say, in the pure air of rural California. It is in the cities, and only in the cities where the beer hall and its associated dens have wrought degradation upon character, that men are found willing to surrender their self-control and self-respect and to become the mere puppets of professional agitators and bulldozers.

Suppose the Grange or the Alliance in California were to assume the right to dictate the terms of rural employment in this State; suppose they were to fix the rates for different classes of work and then demand that nobody but members of their Order should have the privilege of working at any price or upon any terms; suppose they were to appoint inspectors to go from farm to farm to see that their rules were exactly enforced, that no non-Grange or non-Alliance hands were employed; suppose they should take advantage of the busy planting or harvest time to order general strikes; suppose they should appeal to the Government to give them control of all rural labor with the power to legislate on all relations between employer and employed! What would the farmers of California say to such a series of demands? We will leave our readers to answer!

We do not deny, but, on the contrary, distinctly assert, the right of workmen to organize. This right to organize is, in fact, as sacred as the right to labor. What we do deny is the right of those who do organize to limit the rights of those who do not. If the workman at Chicago choose for any reason, singly or in a body, to quit work, they have (provided they have entered into no contract obligations) an undoubted right to do it; but they have no right to demand that others may not take up the work which they leave, upon such terms as they may choose to accept.

The legitimate purposes of organization on the part of workmen are many, and they include, among other things, the regulation of wages, the regulation of hours of labor, and the regulation of industrial discipline in all its forms. There can be no reasonable protest against concerted action to secure desired results, so long as no interference is made with those who may choose to go their own way. But when the organizers undertake, either by force or by any other means, to deny to the non-organizers the right to labor upon such terms as they may be willing to make, they are upon revolutionary and criminal ground.

We assert that the right to organize is as sacred as the right to labor—but not more sacred. The workman who should be required by the laws or under the political administration of his country (as the trades-unionists demand) to join some particular society and subject himself to the rules and discipline of that society before he should have the privilege of doing a day's work, would have the right to feel that his lines were cast in hard places; and it would not be surprising if he should ask what had become of American Liberty. The right of the non-union man—of the man who for good reason or for no reason prefers to make his own contracts disposing of his labor without consulting "committees" or "walking delegates"—is utterly ignored by the trades-unionists. That the rights of this man are just as sacred as their own they seem to overlook or disregard. But no Government based like our own upon liberty and equality can allow the rights of its humblest citizen to be overridden without sowing the seed of anarchy and revolution. It is bound to protect the non-union man in his right to labor just as it is bound to protect the union man in his right to organize. Thus in nearly every great strike we find the power of the Government arrayed in support of the non-unionists because it is the vice of the unionists to seek to over-ride the rights of others in the effort to promote what they conceive to be their own private interests. If Government were to decline or neglect to so protect its non-unionist citizens it would be partial, inefficient and infamous; and it would die, for no Government is worth maintaining, or would long be maintained, which would not or could not protect its humblest citizen in his primary rights. And among these primary rights there is none more natural or necessary than the right to labor.—*Pacific Rural Press.*

THE superior quality of ice sent from Truckee, Nevada county, Cal., is acknowledged all over the coast. Ten years ago the entire amount of ice shipped from this locality did not exceed 10,000 tons. But the superior quality of the ice of the region has gained such favor for it that the annual output now exceeds 160,000 tons. Several large firms within Nevada county have mammoth ice-houses. The Sierra Lakes Ice Company, whose gigantic houses located at Prosser Creek and Boca, on the Little Truckee river, are the largest in this world. At Prosser Creek they have four buildings for storing ice, each building being 450x50 feet, and at Boca they have three huge buildings used for the same purpose, two of them being 350x100 feet, the other 500x40 feet. The combined capacity of the different houses of this company aggregate nearly if not quite 80,000 tons, still the ever aggressive and progressive members of this company are going to greatly increase their storage capacity the coming season by the erection of additional buildings. Suffice it to say that they are the largest and most complete structures of

the kind in the world. All the fruit cars that are sent East from California are stopped at Truckee and re-iced. During the ice-harvesting season the Sierra Lakes Ice Company keep more than 500 men employed.

Smelting American Iron Ores.

In a lecture before the Franklin Institute, Mr. John Birkinhine of Philadelphia says:

To smelt iron ores a fuel and a flux are necessary, and in this country four fuels are employed; namely, anthracite coal, bituminous coal, coke made from bituminous coal, and charcoal. Coke is by far the most in demand for this purpose, and raw bituminous coal is used to but a limited extent, no record being now kept of the comparatively small portion of pig iron made with it exclusively. Including the output of furnaces using raw bituminous coal, alone or mixed with coke, with those employing coke alone for this purpose, we find that of all the pig iron produced in the United States, 70.6 per cent is smelted with coke and bituminous coal.

Coke is also liberally used with anthracite coal in varied proportions in the eastern part of the United States, 13.8 per cent of the pig iron being made with these mixed fuels, and but 3.7 per cent of our pig iron output being smelted with anthracite coal alone; the remainder, 6.9 per cent, is produced by the use of charcoal. At present the relative employment of the different fuels ranks in the following order:

Coke, sometimes mixed with raw bituminous coal.

Anthracite and coke mixed.

Charcoal.

Anthracite alone.

Raw bituminous coal.

Lime is the universal flux used, although different conditions require stone of varying composition, from nearly pure carbonate of lime to a mixture of the carbonates of lime and magnesia, known as dolomite.

The iron ores fed to blast furnaces are also of varying composition; the convenience of these furnaces, the yield of iron, the proportion of other ingredients which they carry, such as silica, lime, alumina, magnesia, phosphorus, sulphur, titanium, manganese, etc., and the expense of mining the ores influencing their use.

It is not within the province of this lecture to discuss the chemical composition of ores, but as the methods of producing different varieties, and the yield of these in iron, will necessarily demand attention, a brief summary of the classification adopted is offered.

The iron ores produced in the United States may be divided into four general classes, without particular reference to their geological occurrence, but approaching within narrow limits the practice generally followed in the sale and purchase of iron ores.

(1) *Red Hematite*, all the anhydrous oxides of iron known by various names, such as red hematite, blue hematite, specular, micaceous, fossil, slate iron, martite, flax seed ore, etc.

(2) *Brown Hematite*, including the varieties of hydrated sesquioxide of iron, variously known as limonite, goethite, turgite, hog ore, pipe ore, pond ore, grape ore, and also some manganeseiferous iron ore, and most of the iron ores mined in the Rocky mountain region for the smelting of argentiferous ores.

(3) *Magnetite*, those ores in which the iron is found chiefly as magnetic oxide; this class also includes some martite mined with the magnetite.

(4) *Carbonates*, those ores which contain a considerable amount of carbonic acid, such as spathic ore, siderite, black band, clay ironstone, etc.

Compressed Air Power for a Mine.

At the Chapin mine at Iron Mountain, Mich., the ore is taken from four shafts, ranging from 300 to over 600 feet in depth, and from an open pit of over an acre in area. The fourth shaft was sunk through a stratum of quicksand, and, in order to pass this, a circle of iron pipes was driven and connected with a refrigerating machine. This reduced the temperature of the contents of the pipe to about zero, freezing the quicksand, and, keeping it frozen, this was then drilled and blasted like rock. The machinery of the mine is run chiefly by means of compressed air, although there is ample boiler capacity to operate the entire plant in case of accident to the compressor plant. This compressed air is carried a distance of three miles in wrought-iron pipe 24 inches in diameter. The Quinnesec falls furnish, under a head of about 52 feet, the water to three 48-inch and one 54-inch turbine. There are three pairs of 32-inch diameter and 60-inch stroke, and one pair of 36-inch diameter and 60 inch stroke compressors. This compressed air is the motive power for the hoisting plant and also for more than 100 power drills. The number of employes varies from 1800 to nearly 2000. The ore is found in four large lenses, and is broken down by means of power drills and high explosives, loaded on mine cars, taken to the shafts, hoisted to the surface, where a cable conveys it to the trestle, on which the cars are automatically dumped into railroad cars or taken to the stock pile, from which the ore is afterward loaded on railroad cars by means of a steam shovel. By this means a 20-ton car has been loaded in four minutes. As much as 2700 tons of ore have been hoisted from one shaft in 24 hours, and in one year over 700,000 tons were mined.

It begins to look as if Oakland will have a new water-works system, and that the old Contra Costa Water Co. will no longer have a monopoly. The plan outlined in the Mayor's message, which is now under consideration by the Council, is to enter into a contract with some one of the new companies to deliver the water at the charter line, whence it will be distributed in pipes laid and owned by the city. Among the propositions are those of W. J.

Dingee to furnish from the artesian wells of Alvarado 4,000,000 gallons per day at \$200,000 a year, and one from W. B. Farwell of a company owning wells at the same place to furnish 6,000,000 gallons per day at the same price per year. Both offers are at a figure considerably less than is now being paid to the Contra Costa Company. The Blue Lakes Company will also make a proposition, and it is said that a movement has lately been started to organize a company for digging wells in West Oakland with the ultimate object of making a bid to supply the city. People who have pipe to sell will be glad to see any of these projects take definite shape.

Earth-Blasting for Tree-Planting.

The use of explosives for loosening hardpan before planting trees or vines is not new in California; in fact, the value of the practice under certain conditions is well established. We have often published descriptions of the practice as followed in this State. The following article on the subject, by Elmer Stearns, in the *Irrigation Age* of Utah, reviews the subject in an interesting manner:

All trees send their roots after moisture, as we often see by examining a tree on the bank of a stream, where the roots will be seen running down to the water or to the moist land at the water's edge. Some trees will send roots upward of 100 feet to get moisture. We can thus see that, to give the tree a sufficient amount of moisture, we must use artificial means where there is not a water supply for the roots to reach.

By loosening the ground to a depth of eight or ten feet, this result has been obtained and a most wonderful growth has been made. This can be done by the use of dynamite. We have records where trees thus treated have made a growth of three and four times that of trees not treated. The dynamite will loosen the ground to a depth of eight or ten feet, thereby holding the moisture for a much longer period and loosening the soil so the roots will have a mellow soil to push through and get the material in the soil necessary for their growth. Nearly all the soil in the arid region forms a sort of hardpan in the dry season; this pan is so broken up by the dynamite as to offer no resistance to the tree-roots in their lateral growth.

In such trees as apples, almonds, pears, walnuts, pecans and olives a gain of two to five years in growth has been obtained in this manner, and the bearing of the trees made correspondingly earlier. So, thus it is possible to get trees that formerly did not bear for six and eight years to bear in four or five. The use of dynamite has passed the experimental period and is now used almost universally in some localities, with the best of results.

Dynamite can be handled with perfect safety, and the total expense to prepare an acre of ground for trees in this way is very small, in fact, not as much as it is in planting where the ground is otherwise pulverized. The kind to use is the 30 per cent grade, which is considered strong enough for nearly all land. Use one-half pound for each charge, unless your land be rocky, then use from one-half to two sticks for a charge.

In preparing the charge, take a fuse six feet long and on one end attach a fulminating cap. First make a hole in the end of the stick of dynamite with some small stick, or a pencil will do. In this hole place the cap, and with a string, tie the fuse and cap firmly to the dynamite stick to hold the cap and fuse in place.

To prepare the ground for the charge, take a crowbar or two-inch augur with a seven-foot shank and make a hole in the ground six feet deep. Then place the dynamite stick with the fuse and cap attached in the bottom of the hole, and pour dry sand in the hole until full. If no sand can be had, any soil will do if tamped quite hard with a wooden stick. The charge will loosen the ground some distance below the bottom of the hole, and for many feet on all sides of the hole. There is little or no danger from the explosion, as the ground only heaves a little bit and no soil or rocks are thrown up. The ground will tremble for 15 or 20 feet away.

After the dynamite has exploded, take a shovel and dig a hole two feet square and of the same depth, filling in the excavation with surface mold and some fertilizer that will aid the tree growth and assist in holding the moisture about the roots. The water from the ditch will go as far down as the dynamite has loosened the soil, and will be retained there until it is used by the tree roots or evaporates. The evaporation can be held in check by a thorough and frequent pulverizing of the surface soil.

As the tree roots go down in this loose soil, they will always find sufficient moisture to make a vigorous growth, and the ground will not check their lateral and downward growth. Thus, in one season roots will make a growth of three times what they would in hard soil, where the water could not penetrate on account of hardpan or the dry, baked soil of the dry seasons.

The roots thus grown make it impossible for the wind to blow the trees down or out. The tap root will often go down several feet the first season. We have seen limbs on some trees make a growth of several feet in one season and it is just as possible for the root to make a similar growth if the conditions for its growth are same as the limbs. By having the soil loosened for a depth of eight or ten feet this growth can be made and at the same time a greater growth of limb made, as the limb growth depends wholly upon the root growth.

Those who have used the dynamite method of preparing the ground for trees say that the expense will not exceed 20 cents per tree and many have done the work at a cost of less than 15 cents per tree for dynamite. Where large tracts of ten or twenty acres are prepared it will reduce the cost even below the figures given, so the plan is within the reach of every fruit grower.

The direct results outside of getting a greater growth in trees and an earlier period in bearing are: The fruit is of a better quality, more even in size and a larger yield per tree. This is easily accounted for by studying the philoso-

phy of the loosened soil and water supply. The soil, being made porous, retains the moisture, which is given to the tree only as fast as needed, while by too much water coming in contact with the roots, as it does by surface irrigation the fruit grows more even and with such regularity that the flesh becomes more firm and the fruit will stand longer shipping and also keep longer. These are very important items with the fruit grower of the arid region who wants to have his fruit sold in the Eastern markets.

The Geological Training of a Prospector.

Arthur Lakes, of the State School of Mines, Golden, Col., contributes to the *Colliery Engineer* an article on this subject, from which we take the following:

One of the first things for a prospector of gold and silver to acquaint himself with is the elements of geology. He can read this up theoretically in many excellent treatises and manuals, such as LeConte, Dana and Shaler's *Manuals* and Geikie's *Hand-Book of Field Geology*, etc., and become learned in the names of eras and epochs and the jargon of scientific names of fossils and minerals and varieties of rocks; but let him not imagine at the end of this process that he "knows geology."

Geology can be no more learned by means of a book, without field work and the actual personal contact with nature and rocks, than chemistry or assaying can be acquired without ever using a test tube or a cupel. The student may, perhaps, be unfavorably situated for this practical field work. There may be no mountains or upheavals of strata or deep, natural ravines within available distance to study. He is located, perhaps, on the great, monotonous, flat prairie. Very well, then let him study what lies nearest him. This same flat, monotonous prairie has an interesting and wonderful history. Let him read up what he can find about this in his books, then go out and examine what he can of the few feet of horizontal strata exposed in some shallow water-course or dry ravine; examine minutely, both with eyes and microscope, the minerals composing this strata. Let him classify and collect and note the different kinds of pebbles scattered over the surface or in the bed of a brook. Let him speculate as to the cause of the undulations of the surface, the deposition and peculiar character of the clays forming the soil. Let him study thoroughly the geology of his native village, his immediate surroundings, first. The knowledge and practical habit of observation so acquired will lead later to more extensive studies in wider fields. A student may be shut up in a big city; let him study the paving stones of the streets and visit the stone-yards of the masons. It will pay him better to take a trip to some distant mountain region than to buy another expensive book on geology after he has mastered the first bare elements. Nothing like field work, eye practice and hammer practice. The student should endeavor, whenever he possibly can, to verify by actual vision and personal experience whatever he reads in his books. When traveling, let him always carry a geological hammer with him, and at any station the train may stop for a few moments "step out" and try to get a specimen of the country rock; at the same time let him study all he can of the geology of the country he is passing through from the windows of the train, aided perhaps by a geological map. The genuine prospector is always looking about him, is everlastingly cracking stones, has always his eye wide open for "something kind o' curious."

If near some mountain region, where, as in Colorado, the whole strata of the earth's crust is upheaved and exposed along the mountain flanks, in the depths of the canyons or on the summit of the peaks, after studying his manual let the student get, if he can, some published geological report on such a country, such as those of the U. S. Geological Survey, abounding in illustrations and geological sections. Let him take this book in hand and go to the very place described and pictured as a geological section, and with his hammer study each member of the section closely. This will make him familiar with the different geological periods, formations, rocks, minerals and fossils as they actually appear in nature rather than as his imagination has supposed them to be from his study of the text-books; book geology and field geology are not always in perfect harmony.

Having studied and learned one local section well, such as that cut by a stream along the foothills of a mountain range, let him repeat the course at the other and more distant points. He will find at each locality, though the main features are the same, there is always an interesting variety, such as new fossils, peculiar minerals, changes of dip, faults, or other structural peculiarities.

Along the flanks of a mountain range, a prospective prospector cannot study too many of these geological sections. Having become familiar with these foothill sections, he is prepared to plunge into the heart of the range itself. At first, and for long distances, perhaps, he will encounter only granitic rocks forming the axis and core of the range. These are well worthy of study and full of variety. Later, the canyon may open into some mountain valley or park, where the strata he studied on the foothills or prairie border are again repeated, and he finds himself again at home. Seizing upon some well-defined and familiar representative of a geological horizon, from this as a standpoint he soon reads off the succession of the rest. Here, however, the appearance and texture of the rocks will probably be different to what they were in the foothills. Heat has so changed or metamorphosed the sandstones and shales, that they are scarcely recognizable as the same rocks as those of the foothills. Yet even here a highly silicified fossil shell or a leaf impression on shales, or sandstones changed into slates or quartzite, will give the prospector his clue and his desired and definite geological horizon, and he will have little difficulty in again arranging and grouping correctly the rocky series. But a prospector has a "practical end" in view; he is "after the precious metal" gold and silver, not after "pure science" or "fossils or sich." What practical use is there, he may ask, in this same careful study of geo-

logical sections, where probably there is not a speck of gold or silver? Simply that minerals and metals of economic value, such as gold and silver, are more frequently found in the rocks of certain geological periods than in others; locally this is especially true. For instance, nearly all the silver-lead deposits of Colorado are found in a certain bed of limestone not over 200 feet thick, to be found only in one geological period out of many others; viz., the lower division of the carboniferous. It would naturally, then, be advisable for a Colorado prospector to be able surely to identify this limestone as well as the geological horizon in which it occurs among the various other limestones of various other periods and ages in the mountains.

Again, gold is mainly confined to crystalline rocks of Archæan age, or to porphyries associated with these. A prospector should be familiar with these rocks and their varieties. Gold is also found in the placers derived largely from the breaking up of these rocks; the ability to distinguish the different pebbles may lead to the source whence the gold was derived. Familiarity with rocks of all kinds is a necessary prospector's education in itself.

The Future of the Horse.

When the agricultural world was invaded by labor-saving machinery, very much of which was operated by the labor of horses or cattle, the cry arose that men were to be crowded out of employment. The same cry was raised in a multitude of manufacturing industries whose operatives declaimed against each new appearance of machinery perfected in the line of economy of human labor. But results have proved the groundlessness of such fears. The introduction of improved machinery simply enlarged production, enabling it to keep pace with a rapidly increasing demand, while men's labors were found to be as much in demand as before, but under somewhat different conditions. In like manner, when a few years ago the possibilities of electricity began to become apparent, and the equipment of horse-car lines with this new motive power was seen to be a coming event, the cry was raised that the breeding of horses was to receive a serious check. Later came the safety bicycle, and thousands, who before depended upon horses for locomotion, sold their teams and took to the less expensive silent steed. Here, then, was another evidence of the passing of the horse. Just how far these fears are likely to be realized cannot yet be fully known, for the application of electricity as a motive power has not yet become at all universal, nor has the bicycle attained the full measure of its popularity, distinctly and widely popular as it has already become; but this much is certain, the time is not far distant when tens of thousands of horses that now draw tram and street cars will be replaced by the trolley or storage battery system.

In the continuous discovery of electrical possibilities, it is impossible now to say whether electricity may not replace horses in other lines of work, such as teaming between points joined by electric railroads, on some of which even now freight, as well as passenger cars, are being run, the freight service being employed in the night when the track is clear. All these signs point to a gradual encroachment upon the work of light and heavy draft horses by the electric current, whose wonderful powers are being so rapidly demonstrated. One need not be an alarmist to foresee a lessened demand for work horses from that demand that would undeniably have existed had electricity not entered this field.

Draft horses will always be needed, but it is the part of wisdom to bear in mind a very possible curtailment of their usefulness, and, therefore, their value in the future. The wise man lays his plans for possible contingencies. If he breeds horses of a particular grade, and thinks he sees a lessening demand for his product in the future, he will straightway get himself in readiness to meet changed conditions. Will he give up breeding horses? Not necessarily. He will simply find out what class of horses is likely to be in demand—electricity or no electricity—and will endeavor to meet the requirements of a changing market.

The person who looks carefully into the conditions that exist in society at the present time cannot fail to be impressed with the rapid accumulation of wealth on every hand, and the tendency to get as much comfort and pleasure out of it as possible. One marked result of this is an enormously increased demand for stylish and high-spirited driving horses, matched pairs and fast roadsters. The noted horse-breeding portions of the country are being constantly searched by the agents of wealthy men looking for horses that meet these conditions, and when they find what they want, the matter of price rarely stands in the way of a purchase. Nothing of an economic or industrial nature comes into this demand, and changing conditions of life are not at all likely to affect it.

There are many sections of our country excellently adapted to the raising of first-class horses, which have as yet not been developed. A substantial beginning in this direction need not necessarily involve the investment of a large amount of capital. The main outlay would be for a pure-bred sire of a strain desired to perpetuate. From this starting point, the character of the stud should be constantly improved by the infusion of better blood. I have never been an advocate of an attempt on the part of the average farmer to raise fast horses, nor do I now advocate it; but I think the time has come to look the matter squarely in the face. If farmers are to continue to breed horses, it is the part of wisdom to let such breeding run in lines where there is the greatest demand and the most money. The secret, or at least one of the secrets, of successful farming is to find out what the public wants and then to furnish the very best quality of the article desired. If the public wants a particular kind of horse and is willing to pay liberally for good specimens of that type, and if farmers are to continue to breed horses, then it is certainly wise to supply the demand.—Webb Donnell in *American Agriculturist*.

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"The present age seems to be peculiarly prolific in the invention of motors for street railways and in new applications of old and recognized motor forces for propulsion of the cars used for urban and suburban transit. Some of these possess decided merits, and present claims for the support of capitalists and of the public that are, at least, worthy of careful examination; others are advanced by parties who are evidently ignorant of the thermodynamic, chemical and mechanical laws upon which some of these operations depend, and schemes are sometimes presented that are visionary and impracticable. A brief review of the plans proposed for street railways, their merits and defects, with the cost of plant and of operation, will probably possess sufficient interest at the present time to excuse the preparation and publication of this volume. The aim of the writer has not been to furnish an elaborate treatise requiring for its comprehension a high degree of technical knowledge, but rather a simple statement of principles and their applications that will be readily comprehended by persons of limited scientific attainments—a treatise for the use and information of investors and of the public."

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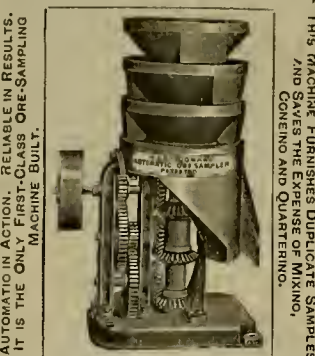
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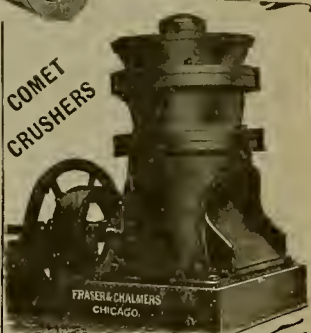
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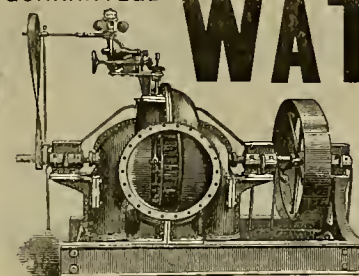


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Mechanical Progress.

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Marvels of modern railroad skill are, says the *Public Ledger*, given daily illustration upon the property of the Pennsylvania Railroad Company, at Broad Street station, where, beyond Fifteenth street, the work upon the spans of the mammoth new train shed is being pushed with great vigor. Two of these great stretches through the air between Market street are already in position and work upon the third has begun. These wrought-iron spans stretch across a space of 307 feet—inside measurement—and rise into the air with a graceful curve. They are outlined against the sky in perfect symmetry, and engineers who, among the thousands that daily pause and watch their building, pronounce them among the finest examples of span structures of their class. The skill and arrangement which allows the building of these spans, which will be the greatest of any that stretch over the network of tracks in the terminal stations of the trunk lines, without interfering with the running of a single train, is also a subject for consideration. The work is carried on uninterruptedly from morning until night, while the schedule of the Pennsylvania trains in and out of Broad Street station is operated without a moment's delay on account of the building. And yet above the tracks and the train shed the giant traveler, upon which the spans are building, rests and moves with the work. This traveler is the largest ever built for the purpose in the country, and is an enormous structure, into the building of which has entered thousands of feet of lumber and tons of iron in the shape of bolts and spikes. The traveler spans the entire distance between Market and Filbert streets, rising in a semi-circular form into the air until at the center it is 150 feet above the ground. The entire weight rests upon a number of four-wheel trucks, which in turn rest upon four sets of track, making the whole structure movable. Two of the track sets are built high above the main set, which are on a level with the regular elevated tracks in Broad Street station. The steam power for the manipulation of the traveler and for the moving of the wrought iron used in the construction of the shed is all located on the traveler. The material is brought in freight cars over the elevated road and unloaded at the point desired, which advantage greatly facilitates its prompt delivery. The trunnions of a number of the spans are already standing at the foundations upon which they are to rise, and the entire mechanical and engineering forces of the contractors are pushing the work as fast as possible. The new track system is almost completed up to the point of the Seventeenth street tower, and, when the spans are all thrown across the space between Market and Filbert streets, the completion of the track-laying will be accomplished very soon. Now that the entire business of the Adams Express Company, formerly at Sixteenth and Market streets, has been removed to the new building at Seventeenth street, the old offices have been abandoned, and the work of demolishing them, expected for some time, has begun. Long before the work on the train shed reaches Sixteenth street the old Adams Express buildings will be torn down for the foundations of the elevated tracks on their site, as the extension across Sixteenth street will have to be finished. The Filbert street side of Broad Street station, above Fifteenth street, is being gradually torn away as the building of the spans moves westward. The improvements beyond the Seventeenth street tower are fully as important as the work to the eastward, which attracts the attention of thousands daily. The new tracks are being laid as fast as possible, and the work of closing Filbert street, beyond Twenty-first westward to the Schuylkill, is moving rapidly. It will not be long before the widening of Filbert street bridge will begin, as when the train shed has reached an early stage of its completion the track system on the elevated will have been enlarged and extended as provided for in the plans.

How to Rig the Indicator.

In using the steam-engine indicator, select some reducing motion with as few joints, and as little complication of parts as possible. In a number of works on indicator practice which I have examined, the manipulation of the instrument and the working of the engine as shown by the diagram is placed before the reader with much minuteness. The reducing of the stroke of the piston to that of the desired length of the diagram seems to me to be somewhat slighted, or passed over with less attention than this subject war-

rants. A chance for error and much annoyance is experienced by unskillful or careless handling of a reducing rig.

The principal use of the indicator for the working engineer is to guide him in the adjustment or setting of his valve gear. The instrument should be applied at least once a week, and some rig for reducing the motion of the piston should be selected which will admit of easy adjustment without stopping the engine. In visiting engine-rooms in my locality I have seen several different rigs which are approximately correct, and of sufficient merit to warrant a reproduction of some sketches descriptive of them.

A neat arrangement consists of a light brass wheel which has two diameters, the larger diameter being of such dimensions that the circumference will be one-half the stroke of the engine, and the smaller having a circumference one-half the length of the diagram. A cord wound two or three times around the large wheel is attached to the cross-head, and a cord from the wheel of smaller diameter leads to the barrel of the indicator when in operation, or is hooked to an idler cord which passes over a leading pulley to a weight while the indicator is at rest. A clock spring attached to the side of the wheel causes the return motion after the cord has been drawn out by the moving cross-head. This rig is a permanent attachment to the front head of an engine I have in mind, is in regular use, and is giving satisfaction. I fitted up one of these wheels at a total cost of three dollars.

If there are several feet of space between the walls of your engine and the engine-bed a rig may be fitted quickly and without cost. Procure a stick of half-inch hard wood an inch and a half wide, and from two to three times the length of the stroke of the engine. To one end of the stick fix a slotted piece of iron, which is intended to be driven by a stud on the cross-head. On the other end of the stick attach a piece of iron with a hole drilled in it for a half-inch pin to work in. Make the pin fast in an angle-plate attached to the wall. The cord from the indicator barrel must lead at a right angle to the line of the cylinder, changing its direction by leading around a small pulley and to a peg placed at a proper distance on the wall end of the stick.—M. Cable, in *Power*.

Press vs. Steam Hammer.

There has been a tendency of recent years to substitute the hydraulic press for the steam hammer in very heavy work, and some presses of very large capacity have been erected. In the Krupp works a 5000-ton press was put in operation not long ago, and the Bachum works, also in Germany, started up a 4000-ton press last year. The Chatillon-Commentry forge in France has also a 4000-ton press, and the Vickers works at Sheffield in England are building the largest machine of the kind in existence, which will be capable of exerting a pressure of 6000 tons. In this country very little use has been made of the forging press, but it is announced that the Carnegie Co. in Pittsburgh has contracted with the Whitworth Co. for a press of great capacity which is to be used for the same kind of work on armor plate and gun forgings, which is done at Bethlehem by the great 125-ton hammer.

The relative efficiency of the hammer and the hydraulic press is a question which has been hotly discussed by experts. About four years ago some very interesting experiments were made at the Arhel forges at Rive-de-Gier in France which failed in their immediate object, which was to establish a definite ratio between the weight of a hammer and the power of a press required to do the same work, but which nevertheless shed some light on this subject. The general conclusion reached was that forgings made under the hammer showed a finer grain and a greater degree of uniformity in texture than those made with the press. It was noted that while hammer forgings showed a better surface, the press forgings had the greater density in the center. These experiments, while their general indications favored the steam hammer, were hardly carried far enough to be conclusive, but a more satisfactory determination may be expected from the work of the great machines referred to above. It is not at all probable, however, that the steam hammer will be superseded, and for many classes of forgings it will always be indispensable.—Engineering and Mining Journal.

CAR-COUPERS.—The law passed by the last Congress in its closing days, requiring all railways to adopt automatic car-couplers on all their cars, will entail a very large expenditure of money by the railways. Chauncey M. Depew, president of the New York Central, said recently that there were between 2,000,000 and 3,000,000 cars in this

country, and that the equipment of a single car with automatic couplers cost about \$20. The total expenditure of the roads for this single item, therefore, would be about \$50,000,000. Automatic couplers have, however, already been extensively adopted. A law similar to the National enactment on this subject was passed by the legislature of New York four years ago, the railways in the State being required to equip annually 20 per cent of their rolling stock with the automatic couplers. Mr. Depew said that the New York Central had complied with the provisions of this State law, and that before the National law became operative all the Central cars would have the automatic couplers. He thought the expense would bear rather hard on the smaller roads. He estimated that if any sole owner of a patent could get his coupler exclusively adopted by all the railways he would soon be the richest man in the world. However, there are some 20 patents, and no danger of a monopoly by one individual.—*Railway World*.

Scientific Progress.

Giant Eucalyptus Trees.

A recent article in *Science* repeats the old idea, which has been frequently refuted, that the *Sequoia gigantea*, or big tree of California, is the largest tree known. It has been shown many times that these trees are surpassed in both height and girth by the gum trees of Australasia. A large number of species is known, and many of them are mentioned in Baron von Mueller's "Extra Tropical Plants." An extract from this book will be of interest, as giving the dimensions of some of these immense trees. Of *Eucalyptus amygdalina*, it is said:

"In sheltered, spriggy, forest glens attaining exceptionally to a height of over 400 feet, there forming a smooth stem and broad leaves, producing also seedlings of a foliage different from the ordinary form of *E. amygdalina*, which occurs in more open country, and has small narrow leaves and a rough brownish bark. The former species or variety, which has been called *Eucalyptus regnans*, represents probably the loftiest tree on the globe. Mr. J. Rollo, of Yarragon, measured a tree which was 410 feet high. Another tree in the Cape Otway ranges was found to be 415 feet high and 15 feet in diameter where cut in felling, at a considerable height above the ground. Another tree measured 69 feet in circumference at the base of the stem; at 12 feet from the ground it had a diameter of 14 feet; at 78 feet a diameter of 9 feet; at 144 feet a diameter of 8 feet, and at 210 feet a diameter of 5 feet. Thus, at a height in the air exceeding the height of almost every North American forest tree, this specimen had a diameter equal to most of our largest forest trees at the ground. Other trees are known with a stem circumference of 66 feet at five feet from the ground. Prof. Wilson and Colonel Ellery obtained at Mount Sabine a measurement of 21 feet 8 inches in diameter of a stem where cut, the length being 380 feet. Col. Ellery had repeatedly reports of trees seven ax handles in diameter, and he met a tree on Mount Disappointment with a stem diameter of 33 feet at about four feet from the ground." Other species also attain enormous size. *Eucalyptus diversicolor* is known to grow 400 feet high, and trees have been measured 300 feet long without a branch! Boards 12 feet wide can frequently be obtained. *E. globulus* grows 300 feet high and furnishes ship keels 120 feet long. *E. obliqua* also attains 300 feet in height and 10 feet in diameter. A note in a recent number of *Garden and Forest* mentions a tree in Victoria 471 feet in height.

The colossal size of the trees of this genus is not the only peculiar feature they possess. Some are of exceedingly rapid growth, and are at the same time very durable. *Eucalyptus amygdalina*, for example, grew to a height of 50 feet in eight years in the south of France. *E. citriodora* grew 20 feet high in two years in a district subject to protracted drought, and a trunk 40 feet long and 20 inches in diameter only broke after a flexion of 17 inches, under a pressure of 49 tons. *E. corymbosa* is very durable, fence posts that had been in the ground for 40 years showing hardly any decay. *E. globulus* grew 60 feet high in eleven years in California, and in Florida 40 feet in four years, with a stem a foot in diameter. The writer has seen trees in California, two years after planting the seed, 20 feet high; and the wood, although easily cut when green, becomes almost as hard as iron when dry. In Guatemala it grew 120 feet in twelve years and had a stem diameter of 9 feet. Railway sleepers made of *E. leucoxylon* were quite sound after being laid 24 years. Piles driven for a whaling jetty in 1834 were taken

out in 1877 perfectly sound, although the water swarmed with teredo. This was *E. marginata*. Still more remarkable is the fact that some species withstand excessive heat and also a considerable cold. *E. microtheca*, for example, resists a temperature of 18° F. in France and 154° F. in central Australia. Besides serving as a timber tree, many species of eucalyptus are used medicinally, producing a volatile oil very useful in treating various infectious diseases, like scarlet fever, especially when applied externally. Grown in malarious districts, they possess the power of purifying the air. Altogether, the genus may be classed as one of the most remarkable in the whole world.—Joseph F. James, M. Sc., in *Science*.

Occupations and Length of Life.

"What occupation tends most to prolong life?" asked a reporter of the chief mathematician for one of the great life insurance companies.

"That is a difficult question," he replied. "I can only answer it by referring to the occupations of persons whose lives are and have been insured by us. Inasmuch as they number several hundreds of thousands, they will afford a pretty good basis from which to draw conclusions on the subject. According to this evidence, it appears that commercial travelers and agents live longer than men in any other kind of business, notwithstanding the hazards which attend transportation by rail and water. Next to them come dentists, teachers and professors, including music teachers."

"And who after them?"

"Next to them in point of longevity are hatters, clergymen and missionaries. The last may occasionally furnish food for the larder of untutored savages, but they are a first-rate risk nevertheless. Next come bankers and capitalists, who seem to live just a trifle longer than butchers and marketmen. Lawyers and jewelers follow, and they are succeeded on the list by merchants, peddlers, milkmen and pawnbrokers. Then come gardeners, laborers, civil engineers and canvassers. Perhaps the treatment which canvassers are apt to receive in ordinary course of their business shortens their lives."

"Where do newspaper men come?"

"O, they don't live as long as any people I have mentioned. Even bookkeepers and bank cashiers, as well as artists and architects, are ahead of them. They come in next, with the printers, physicians, and the gentlemen who are not engaged in any active employment. They follow the apothecaries and photographers, and after them, in order, bakers, cigarmakers, real estate agents, army officers and soldiers, liquor dealers, marines and naval officers. Shortest lived of all seem to be the auctioneers, boardinghouse keepers, barbers and drivers."

"Do you take into consideration the question of a customer's occupation in granting a policy?"

"Not unless it is more hazardous than any of those I have mentioned, though if I were in doubt about accepting the man at a risk for other reasons, such a point might turn the scale."—*Washington Star*.

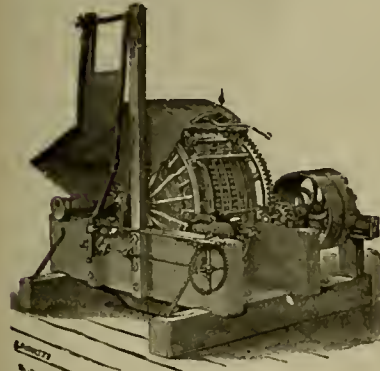
EXTINCT LAKES IN GREAT BASIN.—In an article in *Natural Science* occurs the following paragraph: Turning now to the second region of extinct lakes to which we have alluded, we find in the Great Basin of North America a district of which the geology has been worked out quite recently by the Geological Survey of the United States. It would be impossible in a few words to do justice to the valuable monographs by Messrs. G. K. Gilbert and I. C. Russell, but their main conclusions are these: An enormous area in Nevada, Utah, Oregon and California forms an enclosed basin, now occupied by deserts and by salt lakes with no outlet toward the sea. The basin seems to have originated in late Tertiary times, through irregular earth movements which raised certain tracts and depressed others. The region was apparently altogether above the sea level when the formation of the basin took place, or at any rate was saved from the influx of the sea by higher land. We find, therefore, no evidence that the sea ever penetrated into the region after it became a basin, and there is no evidence of the former existence within it of a marine fauna. Though the sea never penetrated into the Great Basin, there was formerly a much heavier rainfall; so that instead of the existing deserts and salt lakes there were large sheets of fresh water, comparable in size with the Great Lakes on the other side of the continent, and, like them, overflowing toward the sea. It is a most interesting region to the geologist, for the Great Basin well illustrates the formation of lakes through irregular earth movements.

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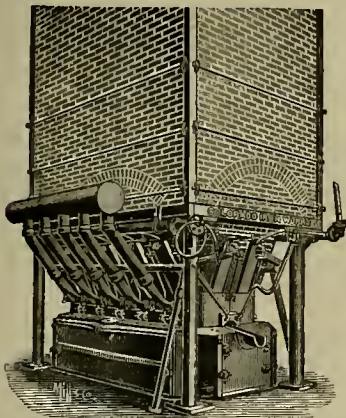
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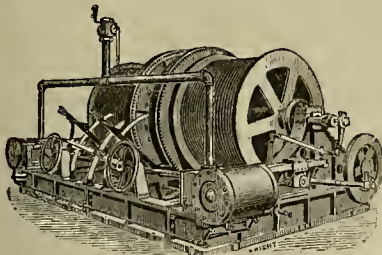
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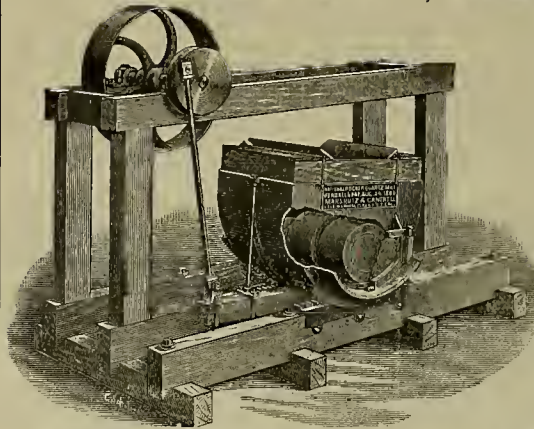
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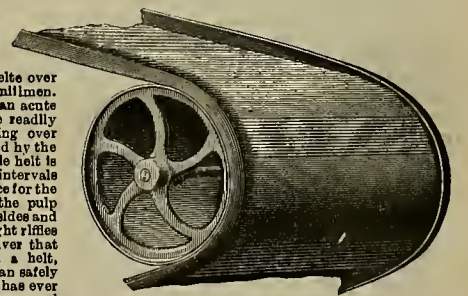
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of two to four feet, have a very slight rifled surface for the
space of three inches, which tends to equalize the pulp
on the belt, and prevent it from hanging on the sides and
forming channels through the center. These slight rifles
also save very fine pulp and the quicksilver that
would otherwise escape with the tailings from a belt,
the surface of which is entirely smooth. We can safely
say that it is a better concentrator belt than has ever
been manufactured. It will last much longer and
will handle more pulp. We also manufacture smooth belts with same flanges when desired.



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Electricity.

Gray's Telautograph.

If expert electricians are not wofully mistaken, says *Iron Age*, another very important aid to the facilitation of business has been perfected. Prof. Elisha Gray, of Highland Park, Ill., after six years of constant experiments, last week exhibited his apparatus for transmitting by wire a *facsimile* of anything written or drawn, the apparatus being of such a simple character that a skilled operator is not necessary. It is claimed that every obstacle which has hitherto defeated the attainment of this long-sought process has been surmounted, and that the apparatus is ready for introduction into practical everyday use. It is styled the telautograph. A transmitter and a receiver are used, each somewhat smaller than a type-writing machine. The transmitter and receiver stand side by side. In sending a message, an ordinary lead pencil is used, near the point of which two silk cords are fastened at right angles to each other. These cords connect with the instrument, and, following the motion of the pencil, regulate the current impulses which control the receiving pen at a distant station. Ordinary paper five inches wide, arranged on a roll attached to the machine, is used by the writer. The receiving pen is a capillary glass tube placed at the junction of two aluminum arms. This glass pen is supplied with ink, which flows from a reservoir through a small rubber tube placed in one of the arms. The electrical impulses coming over the wire move the pen of the receiver simultaneously with the movements of the pencil in the hand of the sender. As the pen passes over the paper, an ink tracing is left, which is always a *facsimile* of the sender's motion, whether in the formation of letters, words, figures, signs or sketches. Apparently, the only limit in reproduction is that of stenographic characters, as the machine makes but little distinction between heavy and light lines.

Assuming that the telautograph is now in as good condition for practical use as was the telephone when first brought out, a magnificent range of possibilities is presented. Private wires for the transmission of messages can be furnished business offices as easily as telephonic communication is now established. A business man can receive and transmit his own messages without the intervention of a messenger boy and also without having them pass under the scrutiny of two or more telegraph operators. Further, not only does he secure secrecy, but he also obtains a record in black and white of his telegraphic correspondence, including exact reproductions of the communications sent by the party at the other end of the wire. The telegraph and telephone may not be superseded, as they have their uses; but the telautograph steps in to occupy a field which neither of them can cover. As the receiver works without any attention, persons having telautograph connections can be furnished with dispatches or messages at any time, day or night, which will be appreciated by those who occupy their offices irregularly.

The *facsimile* of the original writing of a message, which is provided by the telautograph, will avoid many disputes and mistakes arising in the transmission of communications by our present system. Even the identity of the writer or sender is thus preserved, and can be traced by those familiar with his penmanship. Contracts in much more satisfactory form can be made in this way than by telegraphic message or telephone, and it may not be necessary to add, as now, "Please confirm by mail."

ELECTRIC BOAT.—It is expected that a new high-speed electric boat will be exhibited at the annual Fourth of July regatta on the Schuylkill river, at Philadelphia, this year. The Cup and People's Regatta Committee for 1893 has organized with Dr. Conrad Berens as chairman, and his proposition is to rig up an eight-oared shell with a propeller to be driven by electricity. The weight of an eight-oared crew and fixtures is about 1000 pounds, and the electric apparatus and gearing can even exceed that weight a little, since it will be mostly below, instead, as with a crew, mostly all above the washboard. The American Electro-Dynamo Company, of Philadelphia, has secured the contract to make the experiment on an Undine Club eight-oared shell, and the work will be pushed forward at once. The body of the shell will be used entirely for the storage cells and motor, and the one occupant of the boat, who will sit in the coxswain's seat, will be captain, engineer, helmsman and referee of the race. The propeller will be fitted under the shell and will probably be located just back of the coxswain's seat. It is believed that such a

craft will be capable of even greater speed than the Yankee Doodle showed, and will, in addition, be free from all objectionable features which larger boats have on a rowing race course. There will be practically no suction influence such as large boats have over racing shells, and the referee can actually mix with the contesting crews, should occasion require, without interfering with them.—*Electrical Review*.

Electrical Congresses.

It must be admitted, says *Electricity* of London, in speaking of the coming World's Electrical Congress, that no better place and no fitter occasion could have been chosen for such a gathering than will be presented by Chicago during the time of the exhibition. It will be of interest to note that all previous international electrical congresses have been held in connection with universal or electrical exhibitions, and this is, no doubt, due to a desire on the part of the organizers of the congress to afford to the members practical illustrations on the largest possible scale of the science of applied electricity, which could hardly be said to have existed 20 years ago. The Paris Electrical Exhibition of 1881 came as a surprise even upon the most prominent electricians of the time; very few among them knew what a dynamo, an arc or glow lamp or a telephone meant, and a fortnight spent in Paris taught them more than the protracted study of years. The achievements of this exhibition were of a two-fold character. In the first instance, it demonstrated the practicability of electric lighting; and, secondly, it placed applied electricity on a thoroughly scientific basis, by supplying it with units of measurements, such as the volt, the ohm, the ampere and the farad.

Subsequent exhibitions and congresses cannot boast of such remarkable achievements, although they all contributed their share toward popularizing the new electrical appliances and spreading electric knowledge. They each introduced some typical and marked improvements to public notice. The Paris Exhibition of 1881 gave us electric light, the Munich Exhibition of 1882 produced the first experiments on a large scale of distinct power transmission, the Vienna Exhibition of 1883 showed us the first shunt and compound wound dynamos, and the Frankfurt Exhibition of 1881 brought us the practical realization of one of the greatest projects ever conceived—electrical power transmission over a distance of more than 100 miles. The two last electric congresses, however—the one in Paris, in connection with the exhibition of 1889, and that in Frankfurt in 1891—produced very little result. The program of the former congress was one of the most elaborate and most ambitious documents we have ever seen in print, and when the congress was over it was found that not one-twentieth part of the topics proposed for discussion had ever been approached. If the congress, instead of lasting for 10 days, had been prolonged for 10 weeks, they could not have gone through half the program. The Frankfurt congress was simply made the occasion for the reading of some highly interesting papers, but in its results was as fruitless as the Paris one of 1889. The program of the Chicago congress now before us is certainly most promising, and holds out hopes of vast improvement in the nomenclature and definition of electrical units and terms, but we are afraid it is too large a program, and that a week is not nearly sufficient to arrive at a practical result.

NIGHT SIGNALS.—Mr. Badeo-Powell, of the Scots Guards, has devised an ingenious method of signaling by night with the aid of a paper fire-balloon of six or eight feet diameter. When it is desired to send a message, some heads made of a brilliant, quick-burning composition are strung on a piece of quick-match, leaving intervals, and using large and small beads to make the corresponding flashes. The balloon is inflated by burning spirit, or even straw or wood. The message string is then suspended below it, a time fuse attached, and the balloon being sent up, the message is flashed forth. The apparatus is described as very portable; one man can easily carry it, and with it not only can one preconcerted message be flashed, but a few words can be sent up at one time, and those can be answered from a similar balloon from another part, upon which other balloons can be employed to continue the signaling.

GRANITE is the lowest rock in the earth's crust; it is the bed rock of the world. It shows no evidence of animal or vegetable life. It is from two to ten times as thick as the united thickness of all other rocks. It is the parent rock from which all other rocks have been directly or indirectly derived.

Useful Information.

Facts Not Generally Known About Woods.

There seems to be an unfounded but very general prejudice against one of the most durable woods grown in America. The word pine is, in the general mind, associated with that kind of pine used for inside building and finish, the white pine of the North. Such expressions as "soft as pine" or as "brittle as pine" are very common, but applicable to only a few species of the great pine family. Mr. Chas. S. Sargent, of Brookline, Mass., professor of arboriculture in Harvard College, was commissioned by Census Superintendent Walker to collect information respecting the forest trees of North America. Exhaustive attention was given by Professor Sargent to ascertaining the various qualities and behaviors of the principal woods used in manufacturing, testing them under various kinds of strains. This was not done by guesswork, but with apparatus capable of recording exact results. The testing apparatus used is located at the Watertown arsenal, and cost the Government over \$150,000. With this apparatus, specimens of wood, thoroughly seasoned, from various parts of different trees, were tested and results noted and published for the use and benefit of the public.

Looking over the tables, it is found that the Long Leaf Yellow Georgia pine is the peer of any wood for general purposes, and particularly in the manufacture of machinery subject to great transverse strain, and but for the fact that the public have unthinkingly come to refer every wood of the name of pine to that species which has the least resisting power of all the great pine family, ash and oak would long since have been discarded. We find that in 22 tests of the best American white ash, the highest breaking strain was 1210 pounds; the lowest, 389 pounds. Average breaking point of the 22 pieces, 720 pounds. In 27 pieces of the Georgia Long Leaf pine, the greatest strain withstood by any piece was 1381 and the least 770 pounds; the average breaking point being 1078 pounds, as against 720 pounds for the best American white ash. All of the pieces tested were of the same size and shape.

Comment seems unnecessary. There will hardly be a single reader of this article who cannot recall instances in his own experience when he wished the particular piece of pine he had to deal with was not so hard to break.

We quote from the report of the chief of the Division of Forestry, U. S. Department of Agriculture, for 1891: "The long-leaf pine is superior wherever strength and durability are required. In tensile strength it approaches and may surpass cast iron. In cross-breaking strength it rivals the oaks, requiring 10,000 pounds per square inch to break it, while in stiffness it is superior to the oak by from 50 to 100 per cent."

"Contrary to common belief, the tapping for turpentine was found by a large number of tests, lately made under direction of this division, not to weaken, but to strengthen, the timber in cross-breaking, and to increase its stiffness."

Just now the question of the use of the Long Leaf Georgia pine is of considerable interest to many of our readers, and to Texas dealers in agricultural implements, whether the pine used by manufacturers is an inferior wood.

The above conclusions, based on careful investigation, show that the Long Leaf Georgia pine is better than either ash or oak where strength and durability are essential.

The agriculturists of Texas are entitled to the best and should give all possible and consistent encouragement to a more general use of the better material.—*Farm and Ranch*.

VENTILATING COAL CARGOES.—It has been a frequent practice to ventilate a cargo of coal with the view of removing the inflammable gases therefrom. That this in itself is an introduction of a source of danger is made clear by Professor Clowers, of Nottingham. From an account of his observations in the *American Gas-Light Journal* we abstract the following:

Four colliers were loaded with coal from the same seam and by means of the same tips. Three were ventilated and the fourth was not; the former were consumed by fire before reaching Aden, while the latter arrived at Bombay in safety. It was evident that the ventilation of the coal had supplied just that air necessary for its combustion when heated which was absent in the case of the unventilated coal. Coal which has been beaten in the air and has begun to cool again is safe from further heating; hence

storing coal in the air for a sufficient time before loading is calculated to insure the safety of the cargo. The following conclusions were reached: First, the danger of spontaneous firing of coal in large lumps is very slight; it is much greater with smaller coal, and greater still with dust. The increase of danger is due to the larger extent of surface exposed to the air in proportion to the mass of the coal. Second, air-dried coal which contains more than 3 per cent of moisture is dangerous; if it contains less, the danger diminishes. The moisture contained is a measure of the absorbent power of the coal for air, and the more absorbent the coal, the more dangerous. Third, the danger is somewhat increased by the presence of pyrites, in large quantity. Fourth, newly won coal should be shielded from the air as much as possible, to prevent the chance of rapid heating, and for the same reason it is best not to stack it in large heaps, since these retain the heat. Ventilation of the coal often adds greatly to the risk of spontaneous firing. Fifth, all external sources of heat, such as steam-pipes, boilers and hot flues in the neighborhood of the coal, add very greatly to the risk. Spontaneous heating becomes vastly more rapid when it is assisted from without.

The Career of the Malaria Germ.

The malaria germ is an animal parasite. It belongs to the lowest grade of animal life, being a protozoan, and is of microscopic size. It seems to make its home ordinarily in the soil. It is plentiful in swamps. Entering the human body through the lungs, the parasite seeks a home in one of the red corpuscles of the blood. These corpuscles are in shape flat, round disks, bearing a curious resemblance, under the microscope, to pieces of money. How essential their well-being is to health everybody knows. The parasite, taking up his residence in one of the corpuscles, proceeds to multiply, forming a little colony. The colony feeds upon the material of the corpuscle, which thus becomes disorganized and is finally destroyed, so that the hostile germs are set afloat in the blood. At the beginning, they were merely bits of protoplasmic jelly, without any particular shape; but now they become free swimmers and have developed long, hair-like paddles. Each one has three such oars radiating from its body. Thus they make their way through the veins and arteries, following the tide of the circulation. This cannot go on to any considerable extent without seriously affecting the health of the individual. The latter is attacked by chills, alternating with fever. Quinine and other remedies destructive to the parasites relieve these symptoms. However, if the patient continues to be exposed to the absorption germs in a malarious region, medicines will cease to have effect. The blood, invaded by hordes of parasites, becomes filled with disorganized red corpuscles, and nature gives up the fight, death ensuing. Now that medical science knows precisely what it has to contend against in the treatment of this hitherto mysterious disease, it may be able to find more effective remedies. Already the discovery has enabled physicians to correctly diagnose many malarial cases which have a way of counterfeiting typhoid fever and other troubles. In such instances the presence of the parasites in the blood, readily ascertained by the microscope, settles the question.—*New York Ledger*.

HOW GOLD IS WASTED.—The \$100,000,000 worth of gold now mined annually is not nearly enough to meet the world's requirements. The yearly wastage of this metal is enormous. Various kinds of gilding consume great amounts of it. It is reckoned that in Great Britain alone 25,000 ounces are used every 12 months for the making of gold leaf, while not less than 20,000 ounces more are employed in the same length of time for manufacturing gilt buttons. The finest buttons of this description are produced by applying the gold in the shape of fine dust mixed into a paste with quicksilver. The mercury causes the gold to adhere to the base metal, after which it is evaporated by heat, leaving the gold on the surface. Large quantities of pure gold are utilized for the plating of other metals and for ornamental pottery; but by far the greatest waste of gold is incidental to its use for jewelry, which consumes more than three times as much of the metal as is coined. Not less than \$30,000,000 worth of gold is devoted every year to making articles of ornament. Nearly all of this is eventually lost, not more than one-fortieth of it ever returning to the hands of refiners or manufacturers. With gold coins the loss by abrasion in the process of circulation is very considerable. To avoid this, natives of India wrap each coin singly in cloth.—*Boston Transcript*.

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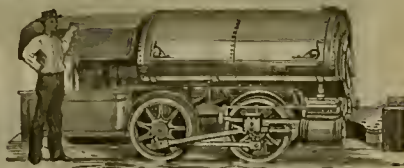
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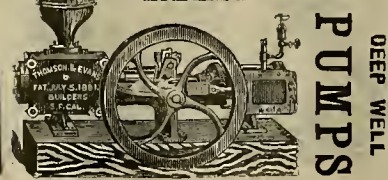
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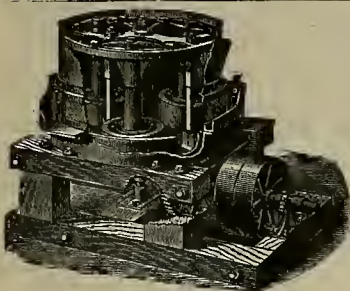
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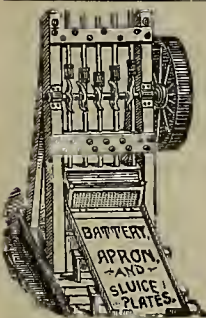
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Mining Summary.

The following is mostly condensed from journals published in the interior. In proximity to the mines mentioned.

CALIFORNIA.

Butte.

RICH QUARTZ.—Oroville Register, April 15: The owners of the Mascot quartz mine, in Oregon gulch, have struck a bonanza. Last week they ran into a chumney where the gold was extraordinarily rich. A single candle-box of the rock was estimated to contain \$300 worth of gold. A mill is to be erected and the contract calls for completing it in 35 days. The mill will be operated by water-power from the Hendrick's ditch, and there will be an abundance of power, as there is a fall of over 200 feet. The mill will be built on a level with the lower tunnel, so that the rock can be handled rapidly and cheaply. This mine, under the name of The Armstrong, was worked many years ago, and it is said 1200 tons of ore paid \$85 a ton. The owners are Woodland capitalists, and they will spare no expense to make this a first-class mine, so far as developments and equipments are concerned. Those familiar with the rock say the quartz is rich, the ledge of good width, and there is a quantity of ore now in sight.

Calaveras.

NOTES.—Mt. Echo, April 15: It is currently reported in this section that an immensely rich strike has been made in the 700-foot level of the Matson mine. It is reported that the Jones mine is looking well and the prospects are very favorable for developing a first-class paying property. The Brunner mine is being pumped out for the purpose of examination by a San Francisco party, who, if satisfied with the mine, intends buying it. Notwithstanding the fact that there are a large number of men employed in the mines of this town, money is scarce and there is a lack of life and stir in the place. Schwartz & Co., who are working their mine on Birney's ranch, inform us that the shaft is now 40 feet deep, and that the vein at that depth measures six feet in width. The ore carries free gold in paying quantities, besides a high grade of sulphurets. Wm. Osborne has been prospecting a vein of quartz in the vicinity of the Hardy mine, near Albany Flat, for some time past, and the other day he struck some good paying ore and a nugget valued at \$5. Indications are favorable for the development of a rich pocket and Billy is not losing any time hunting for it.

Inyo.

SILVER-LEAD MINING.—Inyo Register, April 15: The following gives, in a general sort of way, some idea of what is being done in silver-lead mining in the camps sending ores to the railroad at Keeler: Three carloads, or about 30 tons, of ore are shipped from this latter point weekly, on an average. J. J. Gunn, at the Minnetta, the farthest of these mines from Keeler, is working seven or eight men, and has between 40 and 50 tons of high-grade silver-lead ore ready for shipment. Fitzgerald, at the Modoc mines on the north side of the same hill, is working about the same number of men and is taking out ore in paying quantities all the time. Frank Silva, at the Columbia mine near Darwin, has on two carloads or more of fine ore ready for shipment. He employs three men. E. A. Reddy, at the Defiance, is working seven or eight men, but for two months past has been sinking the main incline, the better to extract ores from below the 400-foot levels. It will take a week or ten days yet to connect the incline with the tunnels or workings previously made at that depth, but from which the ore had to be handled not less than three times before it came to the steam hoisting works, hence the sinking of this incline. McKenzie, at the Lucky Jim mine, is shipping a carload or two of ore, and, with a light force, is taking out ore all the time, though not in such quantities as in times past. The Newtown Co., at Cerro Gordo, is working eight or nine men, and is sending down about three tons of ore every day. Tom Boland, lessee of the Union mines, same place, is working about the same number of men, and will begin hoisting ore by team in a few days. He is also handling a good deal of fine dnet by the jigging process. The low price of silver has depressed mining work in all these camps very much; nevertheless, there is more being done in mining these silver-lead ores than is generally supposed.

THE SODA WORKS.—The Inyo Development Co. at Keeler is working 30 men and a corresponding number of teams—over 40 horses in all—in the construction of new vats. It has now about 50 acres of vats, and is running one pump which keeps a stream of 50 inches of water flowing into the vats constantly. It is shipping now only one carload of crude soda every week, but in due time will vastly increase its shipments.

Nevada.

SHORT MINING NOTES.—Grass Valley Union, April 12: The mining outlook in this district is very encouraging for the year, and we hope to see several new mines commence and old ones to resume operations as soon as the weather will permit. This section of the country has long been recognized as one of the leading mining sections of the globe, and this, with what our mines have yielded to their owners, is making us very prominent in the opinion of wealthy mining men. In conversation with a man who is prominent in mining circles in this vicinity, and whose opinion is always consulted before making any attempt to develop a mine, a Union reporter learned the following news about the several mines around our city: The St. John mine, which is situated near Alta Hill, has commenced sinking again, and have struck a lead of ore that looks better and is more solid than any they have ever

taken out. The North Star mine, one of the oldest quartz mines that is being worked, is taking out some splendid rock. The company have declared one dividend this year of \$50,000, and they expect to make two more of a like amount during the remaining part of the present year. They are working at a disadvantage, having an enormous amount of water to contend with. Their excellent pumping machinery, however, is able to handle it all. A mine which will surprise the people in this neighborhood in the near future is the El Dorado and Geyboand mine, situated near Alta Hill. There is a ledge which is from three to seven feet wide, and which appears to be a very strong one. The ledge runs down toward Slate creek, in which region some rich ore was taken out in early days. The mine has been bonded for two years, and work will be commenced as soon as the weather gets settled. Messrs. Dawson, Coffin and others have a gravel claim, which is an extension of the old Alta Hill gravel channel, that they are working. They expect to strike a channel of gravel any day. The tunnel caved in some time ago and has just been cleaned out. They will make an upraise shortly to tap the channel. Work is not being pushed at the Illinois mine, located beyond the Omaha. The shaft was not properly constructed at the mouth, and a cave was the result, being occasioned by the recent heavy rains. The mine is owned by James Lakenan and others. The Gold Flat mine, of which John Skewes is superintendent, is looking well. They have run a drift in the 200-foot level to the length of 900 feet. This is only one of Mr. Skewes' several successes of developing a mine. The property is situated at Gold Flat, just below the Pittsburg, and on the line of the Narrow Gauge railroad. The Evening Star, or Seven-Thirty mine, is taking out some fine ore, which they will soon crush and determine the real value of it. This mine will be remembered as the one which paid in such large quantities several years ago. It is a pocket ledge, and when found they are very rich. It is owned by a stock company and superintended by Mr. Taylor. The Wyoming mine, of which Mr. Wallace is superintendent, has been undergoing improvements during the past winter. Their boiler burned out two or three months ago, and a new one has been put in its place. The mine will probably commence operations next week.

WASHINGTON DISTRICT.—We get the following Washington district mining items from the Nevada City Herald: Work has been resumed at the German mine, Washington district, under direction of the new superintendent, Mr. W. S. Lillian. The new mill, which is now being put up, is in charge of O. M. Eastman. Mr. M. D. Cooley, who has spent four years in bringing this mine to a successful footing, has resigned and left the district for the present. The San Jose mine, which is about to resume operations will be superintended by a Mr. Long of San Jose. Charles Cairns will be foreman. The Board of Directors held a meeting at San Jose last evening to arrange details. The Blue Jay people have started a new tunnel to tap their ledge several hundred feet below their old works. M. A. Bauch is superintendent. H. M. Place, who is working the Rocky Bar, has started up his pumps again, and will put on men again in a few days. The winter's storms have interfered with operations a good deal.

THE BALTIC MINE.—Grass Valley Union, April 13: The Union is able to announce some news this morning that will surely be well received by the stockholders of the Baltic mine. It is no doubt understood by all that the present stockholders merely have the property bonded from Dr. Hays, Chas. Johnson, A. B. Brady and one or two others. The bond is for \$20,000, and the time that was first given to pay this amount was May, 1894. Many felt that the time was somewhat limited, and believed it would be almost impossible to determine the worth of the property in that short period. So last Tuesday evening Superintendent Snyder met with the original owners and asked to have the time of lease extended one year, which would date it to May, 1895. This the owners of the mine consented to, and the papers were drawn up to that effect. Mr. Snyder informed a Union reporter that the company will have ample time now to thoroughly develop the mine and take out more than enough gold, if it is there, to pay for the property. Of course, if the gold is not there they don't want the mine. The ledge is looking better every day. At present it runs from one foot to 20 inches in width. The tunnel is being pushed along the line of the ledge just as rapidly as possible. It is in 700 feet now. At the end of the tunnel a raise has been started, which will run through to the surface, a distance of 160 feet. The purpose of the upraise is to furnish air, and also to be used as an escape in case of necessity. A shift is at work right along in both the upraise and main tunnel. We were also informed that a five-stamp mill would surely be pounding away inside of two months. Work will be commenced on the mill just as soon as the weather will permit.

Hudson Bay.—Grass Valley Union, April 16: Work at the Hudson Bay mine is being pushed actively at present and about eight men are employed. There are five different shafts being prospected in the region of the Rocky Bar mine and some good rock is unearthed. The shaft at the South Idaho is down to the depth of 45 feet. The new steel whim recently placed on the property is a great improvement and does good work. E. C. Mead, of Sacramento, and Mr. Boardman, of San Francisco, in company with Geo. Gill and D. E. Matteson, went down to the Baltic mine yesterday to have a look at the mine with a view of investing. They are highly pleased with the looks of the mine.

FROM THE PERRIN MINE.—Grass Valley Union, April 16: Some fine-looking rock was brought to town yesterday by Orin Perrin from the Perrin mine, about three miles below town.

The Perrin Bros. own the mine, and if the rock brought up yesterday is a fair sample, the boys have a fine piece of property there. The rock was taken from a depth of about 600 feet, and the ledge is from 18 to 20 inches wide. The rock will pay about \$80 a load. The mine employs about 16 men and is looking well. It is the intention of Mr. Perrin to ship the rock that was on exhibition yesterday to the World's Fair.

THE KENTOCK.—The above-named mine, situated beyond the Idaho, is actively at work taking out rock. They are down to a depth of 100 feet and are running a drift from that level. Thirty loads of rock have been hauled to the Crown Point mill, which will soon be crushed and the real value will be known. They have a three-foot vein, and it appears to be a strong ledge. Six men are kept at work on the property, and the men who are working the property say they have a good mine.

Placer.

PAID ANOTHER DIVIDEND.—Grass Valley Union, April 15: The stockholders of the Morning Star mine were gratified to learn yesterday that the mine had yielded a dividend of \$1 per share. This mine, which is located at Iowa Hill, is owned chiefly by Grass Valleyans, and a dividend causes quite a little cheerfulness in the faces of some of our citizens. J. H. Neff is superintendent.

Plumas.

A QUARTZ MINING COUNTY.—Cor. Plumas National Bulletin, April 15: Is Plumas a quartz mining county? This question has been asked me by several men of means who wish to invest in mining property. From 13 years' experience as a quartz miner and prospector, and from what I have seen of Plumas, I must say that she is such a county. My reasons are these: First, Plumas lies in the center of a mineral belt that extends from North to South America. Here this belt is 50 miles wide. It has several quartz mines that have been paying dividends for 25 years. Scarcely a stream flows from this belt that has not been worked for placer gold. Nine-tenths of these streams have furnished quartz gold specimens and good milling ore. The same can be found to-day. I am aware that mining men do not wish to buy mere specimen mines, but the quartz mines in Plumas have furnished not only large bodies of good milling ore, but rich free-gold specimens as well. In most of the ledges of this county, the quartz is of a soft nature and free-milling. This is the reason more mines are not shown. Most of the veins are capped over, are decomposed, and need men of experience to find them. Plumas is thought of to-day by some as Trinity and Shasta were in 1876—that is, believed to be a county of "pocket" mines. This idea is wrong, for defined ledges can be traced for several miles. In most cases, the failures in Plumas have been the result of bad management. If men would do more development work before building mills, they would reap better success. It should be remembered that not all good prospects make good mines. This is true in any county. One man with a little "get up" collected sufficient samples from different mines in Plumas to win the gold medal at the recent Mechanics' Institute Fair in San Francisco. With proper assistance, Mr. Taylor will be able to display at Chicago as good a collection of Plumas minerals as can be shown from any county.

San Bernardino.

VANDERBILT DISTRICT.—Cor. San Bernardino Times-Index, April 15: I see an article going the rounds of the press that Vanderbilt mining district is an old mining camp, having been worked and abandoned many years ago by Senator Jones & Co. Such are not the facts. In 1874 Jones & Co. bought and operated mines in the Panimint mountains, which lie something like 200 miles north from this camp in Inyo county. The Panimint mines were silver, while Vanderbilt veins are all or principally gold. The truth is that these mines were never worked, or even so much as discovered until found by the Indian, Boh Black, and located by M. M. Beatty. New York district is located over the range and some eight miles south from this camp, and is now being worked by Denver parties. It was first discovered and worked away back in the '60s. It is only within the last few years that prospectors have been aware of, or even so much as expected, the presence of gold veins in this so-called desert region. The truth is that gold is found outcropping in but few places in all this vast stretch of country, the gold veins being generally capped by hematite of iron and sometimes, as is the case here in this district, associated to a greater or less extent with galena ores. I do not mean by this that the Vanderbilt mines carry galena to any appreciable extent, but here and there in many of the veins thus far prospected lead ore (galena) is here and there encountered, and is looked upon by the prospector as a pretty sure indication of finding gold. But little free gold is visible in the ores of this district, it being more generally found in the iron sulphurets. There is no question but what many valuable discoveries will yet be made in this vicinity now that prospectors have learned the character of the veins and the nature of the ores. In truth the desert—as you people insist on calling this section—will soon and is now taking on a new lease of life. I hear almost daily of new and valuable discoveries. Another important lesson the prospector has learned is that he must do development work if he expects to find a mine—sink a hole on his vein. Some of the best prospects in this camp gave only from \$4 to \$10 on the surface. The Bonanza people have acquired the interests of M. M. Beatty in the great Beatty lode of this district, the three first locations made in the district, all on the same vein, and upon which a force of men will be soon set at work. This important mining deal, when fully completed,

will place in the hands and under the control of the Bonanza firm the two great veins of the district, and insures the future of Vanderbilt. The work on the new railroad has been somewhat retarded of late, owing to the non-arrival of material, such as rails and other supplies necessary to a rapid construction of the road. It is now surveyed and the line established to and a few miles beyond this place. Since my last, an election for District Recorder has been held, at which meeting many new features and laws to more fully govern the district were introduced and adopted, and William McFarlane duly elected Recorder for the ensuing year.

NEW DIGGINGS.—San Bernardino Times-Index, April 15: Frank Meacham has just returned from the new placer fields at Borax lake, 150 miles northwest of this city, discovered some six weeks ago by himself and Ramsey Cox, and reports rich returns. He says the gravel is rich and bedrock is found at a depth of only four feet. To those not acquainted with mining operations it is explained that the gold in placer digging is found at bedrock, and the amount of labor involved in getting it out is, of course, proportioned to the depth at which bedrock is found. In this case the diggings are shallow and the gold is easily reached. When the fields were discovered, Meacham and Cox thoroughly prospected them and each located 20 acres, the limit allowed by mining law. They then informed a number of their friends of the richness of their discovery, and these likewise located. The find has been kept very quiet and this accounts for the fact that nothing has been heard of the new diggings. At present there are about a dozen men working at the diggings, but Mr. Meacham states that all the desirable locations have been taken up. At first the men labored at considerable disadvantage, owing to the lack of "washers" in the camp, and were compelled to carry the dirt on their backs to the lake, a distance of half a mile from the diggings, where it was washed in "cradles." Even by this slow and primitive method, however, excellent returns were reaped. Mr. Meacham reports that during the first seven days he was at work he washed out \$10 in dust and nuggets. The locators have now bought "dry washers" and the dirt is said to be worked closer by this process than if water and amalgam plates were used. The placer diggers are making an excellent thing out of the field. A return of \$10 a day is considered small, and some are getting out as much as \$25 or \$30 for a day's work. There are two ways of reaching the fields. One is to go out by wagon from here. Another, and by far the more preferable route, is to take the Southern Pacific to Mojave, and from there proceed by wagon over the old Borax road, a distance of 50 miles. Old miners, seen this morning by a Times-Index representative, say the field is virtually unexplored as yet, and that some exceptionally rich discoveries may be expected.

Sierra.

GOLD BLUFF MILL.—Mt. Messenger, April 15: This is undoubtedly the best built quartz mill in this county. The building is a very substantial structure of imposing architecture, but, unlike the usual mills of this kind, the rock-breakers are set below the level of the battery, from which, by an automatic elevator, made by the Link Belt Co. of Chicago, Ill., the crushed quartz is elevated about 40 feet and thence discharged into a large bin capable of holding about 500 tons. The procedure is as follows: The ore cars are run into a little addition of the main building and thence discharge the quartz into the rock-breaker bin, thence to the rock-breakers and by elevator to the large bin. The reason of this change from the customary gravitation mills (where quartz is dumped at top of mill over grizzlies, coarse rock only going through the rock-breakers) is the location of the tunnel run by the former owner to suit the old mill erected on this site in 1860, obliging Supt. Wm. Kraft to change the program generally followed in quartz mills—and it seems to us that he has overcome this difficulty in the most practicable manner possible. The mill contains 20 stamps, arranged in two sets of 10 stamps each, which can be run together or separate as may be necessary. There are four mortars, of the latest improvements, each weighing 6450 pounds, stamps 850 apiece, dropping five inches, about 90 times per minute. Arrangement of the plates is the most convenient we have seen. About 350 feet of one-eighth inch copper plate and an ounce of silver per square foot will be used. The battery frame is of the most substantial character, entirely independent of the building and battery floor. Self-feeders of the most approved pattern will supply the mortars with quartz. Sulphurets will be saved by perfection copper-plate concentrators, and tailings with percentage of gold worth saving will be eluted to the outside of the building and pumped automatically to the next step for elorage and future treatment. An amalgamating barrel and batea completes the arrangements for treatment in the mill. Water power, through a 16-inch hydraulic pipe with a vertical fall of about 270 feet, from a ditch above the tunnel, is conveyed to the machinery by three Dodds' improved wheels: First, five feet diameter, driving two rock-breakers and an elevator, with a governor to regulate the power needed; second, six feet diameter—stamps, batea and harrel; third, two feet diameter—concentrator. Arrangements for fire hydrants are of the very best kind, trial test through four-inch hose and inch nozzle proving that a stream can be thrown high above the mill and other buildings in the camp. One hydrant is outside and two inside the mill. The Gold Bluff camp contains, besides the mill, assay and retort house, a new blacksmith shop, lodging-house, store-room, etc. The quartz (which to us appeared as very rich stuff) is being hauled out of the mine as fast as the present facilities permit. The rock-breakers and elevator capacity are equal to three times the quantity of quartz that

can be hauled at present out of the mine. The big bin was about one-third full when we saw it last Monday and will probably be closed by the close of the week. The building to contain the assay office and retort room is nearly completed. Supt. Kraft said that a trial test of the battery would be made on Saturday of this week, but the mill will not be run regularly until the assay outfit is in position, so that the pulp during the process, from the beginning to the tailings, may be tested. Taken altogether, the mill is a credit to the county as a whole, and Downieville in particular.

Siskiyou.

GOLD.—Yreka Journal, April 17: According to the mining statistics, Siskiyou is the only county in the State showing increased annual yields of gold, and stands second as a gold-producer, Placer being in the lead. This county is attracting more attention among mining men than any other section of the entire coast, and is destined to become a rich field for the investment of capital in quartz, placer, hydraulic and river mining. The Yreka Blue Gravel Mining Co. at Greenhorn, just south of Yreka, now works eight hands to a shift, running the apparatus day and night in hoisting pay gravel and keeping the water drained. Good pay is realized and the body of blue gravel increasing in thickness as the work progresses. This claim, when well opened and extended up the creek some distance, will undoubtedly pay handsomely. The Scott Valley News says that quartz yielding from \$10 to \$20 per ton, in ledges ranging from 20 inches to 4 feet in width, is reported in Quartz valley.

Trinity.

BOUGHT ANOTHER.—Shasta Courier, April 15: We are informed that the owners of the Brown Bear mine this week bought the McDonald mine at Deadwood, which adjoins the Brown Bear.

UNPRECEDENTED SHOWING.—Trinity Journal, April 15: The showing made by the Trinity River Hydraulic Gold Mining Company on the Hubbard mine during the time they have had water on the property is unprecedented since "the days of '49." Last week we mentioned the clean-up from the flumes after 125 hours run with 300 inches of water. Since that issue the under-currents have been cleaned up and about \$1000 realized. This, with the \$4000 clean-up from the flumes, makes fully \$5000 for the 125 hours run of 300 inches of water. The water is steadily increasing and the production will no doubt increase proportionately. Since "the days of '49" we know of no mine in this county that has made such a showing in the same length of time with the same quantity of water. The bedrock ditches have not been cleaned up yet and it is estimated by all good hydraulic miners that about one-half of the gold remains in these ditches, particularly where the gold is heavy and coarse. The bedrock is pitching back where this company is now working and the prospect for a mountain of gravel is excellent. It is estimated by competent judges that sufficient gold will be taken out this season to put the company nearly even, if not entirely so. The ditch stands exceedingly well and the property is managed very economically by A. G. Dunbar, and the investment is considered one of the best that has been made here for many years. One other clean-up (the first) was made from the upper flume after a run of 42 hours and the result was 80 ounces, or a little over \$1500, making the total output a little over \$6500 for two weeks' work. So far the results have exceeded Mr. Dunbar's estimates, showing that he is careful, non-visionary and a safe man to handle a large property.

WORK BROINS AT CINNABAR.—Trinity Journal, April 15: While D. G. Reid, Esq., was in San Francisco last week, he met A. McCaw and W. J. Simpson, two of the directors of the Integral Quicksilver Mining Company. They informed him that they would leave for Cinnabar on Sunday, the 9th inst., and would start up the works for the season. The furnace-men also went to Cinnabar last Sunday. It is the intention of the company to work their mines on a large scale. This summer over 100 men will be employed, and as the mines develop, more men will be added. They already have one large furnace erected and will build two more. The roads leading to Cinnabar are in frightful condition and will retard work in the camp materially the coming season. Supt. McCaw is much pleased with the prospects of the mines. The Cinnabar group of mines comprise the finest deposit of cinnabar ore in the State and a few years will see New Almaden repeated in northern California. The ore is very rich and found in large veins. On the Boston mine recently a crosscut showed a 40-foot vein of high-grade rock. The principal companies operating at Cinnabar are the Integral of New York and the Altona of San Francisco. In addition, there are a large number of locations and patented claims on which but little work has been done. Cinnabar has a bright future and will undoubtedly be the greatest mining camp in northern California.

OUR GOLDEN STREETS.—Weaverville Journal, April 15: A party of gentlemen were sitting in the office of the Union Hotel last Monday talking placer mining and about the pay gravel in and about Weaverville basin, when the assertion was made that a good prospect could be obtained in the streets of the town. An Eastern gentleman present thought this remark a little difficult of digestion, whereupon Mr. Panson took a shovel and pan and, accompanied by the party, took a panful of dirt from the street in front of the hotel. The dirt was washed, yielding about 30 colors, several quite coarse. The gentleman was convinced and, carefully folding the "clean-up" in a piece of paper, put it in his pocket to show his friends. He said it was the first town he was ever in whose streets were paved with gold.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, Apr. 15: 1500 level.—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 15th floors above the sill floor of this level. 1600 level.—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connecting with the north drift on the 1500 level; also extracting a few tons of ore from the old stopes east of the main south drift. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the upraise No. 6, carried up from the main north-west drift; also from the old stopes in working north from the crosscut run west from the north-west drift. From the drift run west from these north workings, 27 feet up, the upraise started 50 feet in from the mouth of the drift, has been carried up 27 feet; total height, 41 feet; the top being in a quartz formation carrying a low assay value. Have continued to stope out ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main north-west drift. Have extracted during the week from all parts of the mine 655 cars of ore, about 645 tons. Shipped to Morgan mill 665 1990-2000 tons of ore. Average assay value, per railroad car samples, \$38.44. The assay value per battery sample of all the ore worked at that mill during the week (630 tons), was \$32.63 per ton.

OPHIR.—500 level.—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level.—The winze now going down below the sill floor of this level has been sunk during the week 8 feet; total depth, 52 feet. The bottom is in porphyry and clay showing streaks of quartz which carries a low assay value. We have commenced the work of enlarging this winze by carrying up from the bottom a second compartment. It will take all the coming week to complete this work, and then we will begin the running of crosscuts from the bottom of the winze.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 21 feet; total length, 131 feet, continuing in a softer porphyry formation carrying clay separations and showing fine lines of quartz. 500 level.—Have continued making necessary repairs, jointly with the Ophir Co., in the west drift from the Ophir shaft on this level.

UTAH.—340 level.—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 12 feet; total length, 93 feet; in quartzite and clay formation, with several inches of water flowing from the face.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 16 feet, making the total length 232 feet; the face is in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 21 feet, making the total distance west of the joint shaft 3100 feet; the face is in soft porphyry and clay.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 21 feet, making the total distance west of the shaft 3100 feet; the face is in soft porphyry and clay.

ANDES.—On 420 level north drift from east crosscut No. 1 north, advanced 16 feet; total length, 217 feet; formation, porphyry and streaks of quartz.

GOULD & CURRY.—200 level.—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been extended 10 feet, passing through porphyry; total length, 426 feet. Suro tunnel level.—We have resumed work in the joint west crosscut which was started in the end of the east crosscut from joint north drift and expect to make the connection with the winze the coming week.

BEST & BELCHER.—200 level.—The north-west drift has been extended 17 feet, passing through clay and quartz; total length, 232 feet. 900 level.—The southwest drift started in west crosscut No. 3, 20 feet from top of upraise No. 1, 1000 level, has been extended 22 feet; total length, 100 feet; face of drift in porphyry and seams of clay. Suro tunnel level.—We have resumed work in the joint west crosscut which was started from the end of the east crosscut from the joint north drift, and we expect to make the connection with the winze the coming week.

HALE & NORCROSS.—In the main shaft are easing the timbers between the 1000 and 1100 levels. Main Incline.—We continue making the necessary repairs. 1800 level.—Advanced west crosscut on our south boundary 15 feet; total length, 88 feet; face in porphyry and quartz.

CHOLLAR.—Work in the mine was suspended on the 9th instant, owing to necessary repairs being made to surface machinery; work was resumed on the 14th instant.

POTOSI.—Work in the mine was suspended on the 9th instant, owing to necessary repairs being made to the surface machinery. Extracted and sent to mill the past week 143 tons and 1000 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 200 tons. On hand at mill, 84 tons and 1500 pounds. Average battery assays, \$22.71; average car sample assays, \$23.84.

OCCIDENTAL.—The main north drift on the 760 level has been extended 9 feet; total length, 721 feet; face is in hard footwall. The

upraise above No. 2 winze in south drift, 750 level, is up 103 feet; the top shows ore of fair quality. The Zagid drift, Suro tunnel level, has been extended 10 feet through hard porphyry; total length of main drift, 922 feet.

KENTUCK.—We continue to extract from two to three tons of ore per day from the 160 level of the average value of \$32 per ton. Have started an east crosscut from the end of drift on 1100 level near Jacket south line; the face is in ore of fair grade.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 8 feet; the formation is quartz, some of which gives fair assays. The south drift from No. 4 west crosscut, 800 level, is in a distance of 10 feet; the face is in soft porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week, making the total distance from north line, 93 feet, the face is in hard porphyry.

Morey District.

AN IMPORTANT STRIKE.—Eureka Sentinel, April 15: David Smith returned last Tuesday from a visit at Morey, Nye county, Nevada. He informs us that a strike of great importance was made last week in the Magnolia, one of a series of mines principally owned by H. A. Cohen. The strike was made in the Keyser tunnel, at a depth of about 530 feet from the surface. The ledge matter varies in width from 6 to 18 inches, all of which assays from 300 to 400 ounces in silver and some of the assays run as high as \$1600 per ton. This is an important strike, for the reason that the knowing ones have always croaked and said that the ore did not go down. The late strike has demonstrated that the ore does go down, and there is no telling to what depth it will go.

COLORADO.

CRIPPLE CREEK MINES.—Cor. Denver State Mining Journal, April 13: A claim is being worked by E. Daniels in the rear of the Grand View Hotel in which a 30-inch lead has been struck. The shaft has been sunk to a depth of 40 feet, and an assay of \$36 has been obtained from the pay streak. The Isabella Company has commenced hoisting ore from the Buena Vista shaft after a shut-down of 60 days. The hoisting plant is the most complete in the camp. The shafts and drifts have been thoroughly re-timbered and put in good shape during the shut-down. It is expected that this property will be a considerable shipper to the smelters during the coming months. A large body of ore is in sight ready to be stoped out. J. K. Mullen has sold to C. V. der Bryce an undivided half interest in the Fisher lode on Beacon Hill for \$3000. There were sold yesterday 66,000 shares of Jefferson stock at 1 1/2 cents per share. Progress is being made in the Hidden Treasure, on Bull mountain. The shaft is down 100 feet, and drifting is about to be commenced. It is hoped to catch the Pharmacists vein. The Victor Company has declared a dividend of five cents a share. This company is stocked for 200,000 shares. The dividend thus amounts to \$10,000. The Beaver Park stamp mill has started on a contract to treat the ore of the Pharmacists Company. A half interest in the Gold Dollar. Areqa townsit claim, has been bonded by T. G. Jackson and J. Sheridan from George Mayhew for a consideration of \$15,000. Some specimens of wire gold are stated to have been found in the Gold Dollar. Three shifts have been put on to work on this claim. There is a reported strike of rich ore on Saddle mountain, 12 miles west of the camp. The Mollie Kathleen is a promising claim near the Gold King, and has been worked steadily during the past year. Recent assays and mill-runs from this property show a fine body of ore running from \$26 to \$78 per ton. A five-months bond has been taken on it by Col. J. Hutchinson of San Francisco, and a force of men has been put on for a further 100 feet of development work. This claim will probably be a shipper within the next few weeks. A strike has been made on the Lottie, located on Bull mountain a little north of the Blue Bird. Recent assays on the ore from this claim returned an average value of \$50. A fresh attempt is about to be made to work the Pike's Peak placer to some advantage.

MONTANA.

THE PARROT SMELTER.—Butte Inter-Mountain, April 15: Official denial is made of the statement that the Parrot smelting plant is to be moved. Nevertheless there must have been something more than empty gossip in the stories printed about the Big Hole river scheme, and time will demonstrate the precise significance of those stories. This newspaper is gratified to learn that the old plant will remain on its present site, because it employs several hundred men who have built homes near the works and who could ill-afford the depreciation in their value which the removal of the smelter would bring about. It may be that the Parrot intends to build a new plant on the Big Hole with a refinery and run both the old and the new one. The fact that the old works are not to be removed simply calls attention to the necessity of immediate action in the matter of submitting to the people the proposition to bond the county to raise money for the abatement of the smoke nuisance.

A LOSS TO MONTANA.—Close upon the heels of the departure of J. H. Robinson of the Drumhoun comes that of Mr. W. W. Adams, who, on Saturday, will leave for Colorado to take charge of the Bassic mine, one of the great properties of that State, which has for some time, we believe, been idle. Mr. Adams for many years had charge of the Hope mine at Phillipsburg, was afterward connected with the Blue Bird of Butte, and still later with the Iron Mountain in Missoula county. He is known throughout Montana as a capable, experienced and practical miner, and his departure will cause general regret in mining circles in this State where his success in his

business, his perfect honor as a gentleman and his uniform courtesy have made friends of all who have known him.

NEW MEXICO.

THE PACIFIC SHUT DOWN.—Silver City Enterprise, April 15: Last week Superintendent Spiller of the Pacific Gold Mining Company, of Pinos Altos, was notified by the Silver City Water Company that the mill would have to suspend operations for a short time until the water company's reservoir was replenished. On notifying the company it was decided to shut down the mill and mine. The probabilities are that operations will not be resumed until the company takes some steps for the reduction of their ores at the mine. The mill at Silver City will be moved to the mine and water procured from one of the many sources of supply near Pinos Altos. It may be months, perhaps years, ere the mine and mill will be started again. The property is a good one and would pay well if the company would give their practical superintendent, Mr. Spiller, half a show to work it. During the past year \$36,000 has been paid for hauling, when two-thirds of that amount would have paid for moving the mill and piping water to the mine. The sum annually paid for hauling would alone be a large income for the company, and pay fully 25 per cent per annum on the total amount actually invested in mine and mill after it was moved.

OREGON.

THE GOLD DISTRICTS.—Baker City Democrat, Apr. 7: In view of the demand for gold properties and the scarcity of favorable fields for operation, it is encouraging to the people of this part of Oregon to know that almost at their door exists just what the mining world is looking for—districts where gold deposits are to be found—a field for operation that eclipses any other part of the Northwest; in fact, a section of country that presents better opportunities for the investment of capital, and offering better guarantee of good returns on the money invested, than any other section on the Pacific Coast. The first districts calling for mention, on account of their proximity to Baker City, are the Virtue and White Swan, lying in a purely gold belt extending east from this city to Snake river, a distance of 30 miles. The Virtue mine has long been noted for the richness of its ore deposits, and the extent and value of its product is being manifested daily, the mine being operated by a ten-stamp mill on ore from the upper levels. As soon as the mine is cleared of water, the work of which is under headway with a Knowles pump, an additional force of miners will be added and ore from the large deposits in the lower level will be extracted. The Virtue is making such a showing as gives great encouragement to the stockholders of the company. Of the White Swan mine, if the truth was said regarding the richness it has developed in the few months it has been operated since its discovery, the facts would hardly be believed, for its wealth has been something like marvelous. Suffice to say that the ten-stamp mill running on the property is turning out bullion at the rate of \$500 per day. Other properties in the vicinity of these mines are being developed with good prospects, and the outlook is very favorable for several other producers to be added to the list in the near future. In Cornucopia and East Eagle districts a splendid showing of gold deposits exists, and the properties that are being operated are fully demonstrating the merit of the camps. In the Connor Creek district and on Burnt river is a gold belt that promises much, and there will be energetic prospecting done this summer. Several companies have already taken hold and have bright prospects. The Robinsonville and Smpster districts and country tributary present a field not often found, and development already accomplished is a fair indication of the extent of the gold deposits in this part of Baker county. The hub around which the mining circle swings is Baker City, and from this point all roads lead. The camps are easy of access, and there is every facility for mining.

Mining Share Market.

A better tone has been apparent in the stock market during the week, and prices have been somewhat strengthened. Transactions have been larger in volume, though no very heavy business is reported. Operations in the Chollar and Potosi mines have been resumed, the new engine shaft having been put in place. The Nevada mill has started up 25 stamps on ore from the Chollar and Potosi mines. Pretty good ore is coming out of Con. California and Virginia. Mr. John W. Mackay will leave in a day or two for Colorado, San Diego county, and return in about two weeks. By that time probably Mr. Eckert will have his report ready on the feasibility of pumping out the Comstock lower levels.

In another column of this issue will be found the announcement of The Crane Co., who have been appointed agents on the Pacific Coast for the following brands of belting: Hoyt's short-lap leather belting, Gandy Belting Co. and Boston Belting Co. Mr. W. T. Lally manages the affairs of this great company on the Pacific Coast. The Crane Company are perhaps the largest manufacturers of pipe fittings, brass goods, etc., in the United States. Their place of business is at 405 and 407 Market street, San Francisco, California.

To the World's Fair!

WEEKLY EXCURSIONS!

Are you going? If so, call on or write to the undersigned before arranging for your trip. The "SANTA FE ROUTE" is the only line under one management from California to Chicago! Palace and Tourist Sleepers through to Chicago every day without change! Excursions every Tuesday. W. A. BISSELL, O. P. A., 650 Market Street, Chronicle Bldg., San Francisco, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, April 20, 1893.

A notable event in silver circles during the week was a threat of Secretary Carlisle to redeem treasury notes with silver. A Washington dispatch says: "Under the Silver Act of 1890, there is at present outstanding \$130,000,000 in notes, and they are being constantly redeemed in gold at the New York Sub-Treasury. Their redemption in gold has been a matter of accommodation on the part of the Treasury Department, as the law gives the Secretary of the Treasury the discretion as to whether they will be redeemed in gold or silver. Now that the gold balance is reduced the Secretary of the Treasury is considering the advisability of using his discretion and paying these notes in silver."

"If Carlisle determines to take advantage of the discretion given him it will be a more difficult matter for New York brokers to obtain gold certificates, and Treasury notes would leave them with less upon which gold could be obtained. There is a feeling among some men who have been prominent in financial circles, that, should Secretary Carlisle issue an order stopping this redemption, it would approach something of a sensation."

THE METALS—Silver has developed more firmness during the week. Copper is a little weaker. Tin is stronger. Lead shows no change.

San Francisco Metal and Coal Markets.

ANTIMONY.		STEEL.	
For D.	@ 14	English, D.	@ 18
BORAX.		Canton tool	@ 84
Refined, in car lots	@ 7 1/2	8 1/2 Dia. tool	@ 8 1/2
For D.	@ 7 1/2	7 1/2 Dia. Hammer	@ 10
Concentrated, do.	@ 6	Machinery	@ 4
All grades, jobbing at advance.		Tool Calk	@ 4 1/2

COPPER.		TINPLATE.	
Bolt	@ 22	B. V. steel grade	@ 5 87 1/2
Sheeting	@ 22	14x20, spot	@ 5 87 1/2
Ingot, jobbing	@ 13	14x20, 14x20	@ 5 87 1/2
Do, wholesale	@ 13	Do roofing, 14x20	@ 5 87 1/2
Fire Box Sheets	@ 24	Do, 20x23	@ 11 75

IRON.		PIO TIN.	
Bar, base	@ 41	Spot @ B.	@ 24
Norway, base	@ 41	COAL.	
PIO IRON.		SPOT FROM YARD—PER TON.	

Eglington, 22 Spot	@ 22	Wellington	@ 88 00
Glengarnock	@ 25	Greta	@ 5 37 1/2
Am. Soft, No. 1	@ 25	Nanaimo	@ 6 50
Oregon Pig	@ 25	Gilman	@ 6 00
Puget Sound	@ 20	Seattle	@ 6 50
Canal	@ 25	Coos Bay	@ 5 50
Langston	@ 25	Canal	@ 8 50
Thorncliffe	@ 25	Egg, hard	@ 12 00
Gartbarrie	@ 25	Cumberland, in sacks	@ 16 00
Barrow	@ 25	Do, bulk	@ 14 00
Carroll	@ 25	Do, in sacks	@ 11 50
CHROME IRON ORE.		Do, in sacks	@ 11 50
Pertout	@ 100	West Hartley	@ 8 00

LEAD.		DOKE.	
Flg.	@ 41	Austral	@ 50 10 00
Bar	@ 41	English, to load	@ 50 10 00
Sheet	@ 41	Do, spot, in bulk	@ 50 10 00
Pipe	@ 41	Do, in sacks	@ 50 10 00

Drop, sizes smaller than		DOKE.	
B. 1/2 size of 25 lbs.	@ 18	English, to load	@ 50 10 00
Do, B. and larger sizes	@ 20	Do, spot, in bulk	@ 50 10 00
Do, 1/2 size of 25 lbs.	@ 20	Do, in sacks	@ 50 10 00
Do, 1/2 size of 25 lbs.	@ 20	Cumberland	@ 9 50 1/2
Home trade, pr.	@ 41		
For export	@ 35		

Eastern Silver Markets.

NEW YORK, April 20.—Following are the closing prices for the week:

Silver in		London, N. Y. Copper.		Lead.		Tin.	
Thursday	@ 38	82 1/2	\$11 30	\$4 10	\$20 95		
Friday	@ 38	82 1/2	\$11 25	\$4 12 1/2	\$21 00		
Saturday	@ 38	82 1/2	\$11 25	\$4 12 1/2	\$21 00		
Sunday	@ 38	83	\$11 25	\$4 12 1/2	\$20 90		
Tuesday	@ 38	83	\$11 25	\$4 12 1/2	\$20 70		
Wednesday	@ 38	83 1/2	\$11 25	\$4 12 1/2	\$21 75		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING APRIL 11, 1893.

- 495,164.—DISPLAY SHELF.—Etc.—Bessing & Barker, Los Angeles, Cal.
 495,017.—VEGETABLE DROOER.—John Burns, Los Angeles, Cal.
 495,301.—CHILD'S CARRIAGE.—Eveline L. Campbell, S. F.
 495,307.—WASHING MACHINE.—F. J. and M. C. Coon, Walla Walla, Wash.
 495,164.—GARMENT SUPPORTER.—Elliott, Bemis & Ward, Los Angeles, Cal.
 495,322.—PUMP POWER.—P. Frichette, Sheridan, Cal.
 495,459.—INKSTAND.—P. D. Horton, Oakland, Cal.
 495,460.—INKSTAND.—P. D. Horton, Oakland, Cal.
 495,340.—RAILWAY CHAIR.—H. A. Iddings, S. F.
 495,348.—GAS COMPRESSOR.—E. Lawson, S. F.
 495,259.—SAWMILL SETWORKS.—J. P. McClure, S. F.
 495,261.—CAR CONSTRUCTION.—G. W. McNear, Oakland, Cal.
 495,423.—SHINOLE PACKAGE.—G. H. Megquier, Anacondas, Wash.
 495,424.—PACKING SHINOLE.—G. H. Megquier, Anacondas, Wash.
 495,257.—TUBE-SPLITTING MACHINE.—Joseph Moore, S. F.
 495,426.—CAN-BODY MAKING MACHINE.—Murch & Gray, S. F.
 495,427.—BODY AND BED WARMER.—Mary A. Murphy, S. F.
 495,360.—PARACHUTE PROPELLER.—E. Nyswanger, Haoford, Cal.
 495,281.—EXPLOSIVE ENOINE.—F. E. Tremper, S. F.
 495,079.—WHIRLING TOY.—F. E. Williams, Alhambra, Cal.

The following brief list by telegraph, for April 18, will appear more complete on receipt of mail advices:
 California—John A. Barker, Pasadena, wrench;

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		NO. AMT.		SECRETARY AND OFFICE IN S. F.	
Belle Isle M Co, Nev.	18	100	March 24, May 1, May 25	J W Pew, 310 Pine	
Boile Co M Co, California	15	250	Feb 13, March 2, April 28	H D Walker, 309 Montgomery	
Bullion M Co, Nevada	41	250	April 13, May 17, June 7	R R Grayson, 331 Pine	
Chollar M Co, Nevada	24	250	April 17, May 23, June 13	C E Elliot, 309 Montgomery	
Cons Imperial M Co, Nevada	33	300	March 23, April 26, May 17	O L McCoy, Mills Building	
Cons N. G. and G M Co, California	1	50	March 17, May 6	T Wetzel, 310 Sansone	
DeLill M Co, Cal.	3	100	March 3, April 12, May 3	C F Hunt, 14 Sansone	
Eveleving Star M Co, California	9	10	April 11, May 15, June 8	J J Seville, 320 Sansone	
Goleia M Co, Cal.	2	100	March 9, April 22, May 16	D M Kent, 330 Pine	
Gould & Curry M Co, Nev.	71	20	April 10, May 15, June 6	A D Durbow, 309 Montgomery	
Gracie M Co, Cal.	34	20	April 10, May 30	O O Harvey, 303 California	
Jackson M Co, Nev.	11	20	March 28, April 29, May 17	O R Jones, 320 Pine	
Jackrabbit M & M Co, Nevada	3	50	Mar 27, May 2, May 22	T Wetzel, 320 Sansone	
Lady Washington Ous M Co, Nevada	9	100	March 17, May 23, June 13	L Osborn, 309 Montgomery	
Mexican M Co, Nevada	47	250	March 18, April 20, May 11	D M Kent, 330 Pine	
Mono M Co, California	33	100	Feb 20, March 27, April 21	H D Walker, 309 Montgomery	
Nevado M Co, Nev.	25	100	March 28, April 29, May 22	J W Pew, 310 Pine	
North Belle Isle M Co, Nevada	23	100	April 17, May 23, June 13	J W Pew, 310 Pine	
Occidental M Co, Nevada	12	150	March 17, April 20, May 11	A K Durbow, 309 Montgomery	
Palmer M Co, Nevada	3	100	March 7, April 21, May 1	E B Holmes, 309 Montgomery	
Pine Hill M Co, Cal.	2	300	March 22, April 24, May 14	A O Hare, Pier 5, Stewart	
Sierra Nevada M Co, Nev.	104	250	March 16, April 12, May 1	E B Holmes, 309 Montgomery	
Union Cons M Co, Nevada	47	250	March 16, April 12, May 1	O O Harvey, 303 California	
Yellow Jacket M Co, Nev.	54	250	March 16, April 12, May 1	A W Haves, 309 Montgomery	
Yellow Jacket M Co, Nev.	54	250	March 16, April 12, May 1	W H Blauvelt, Gold Hill	

COMPANY AND LOCATION.		MEETING.		DIVIDENDS.	
Church M Co, California	Annual	Annual	Annual	Annual	Annual
Cons Imperial M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Cons N. G. and G M Co, California	Annual	Annual	Annual	Annual	Annual
DeLill M Co, Cal.	Annual	Annual	Annual	Annual	Annual
Gracie M Co, Cal.	Annual	Annual	Annual	Annual	Annual
Jackson M Co, Nev.	Annual	Annual	Annual	Annual	Annual
Jackrabbit M & M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Lady Washington Ous M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Mexican M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Mono M Co, California	Annual	Annual	Annual	Annual	Annual
Nevado M Co, Nev.	Annual	Annual	Annual	Annual	Annual
North Belle Isle M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Occidental M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Palmer M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Pine Hill M Co, Cal.	Annual	Annual	Annual	Annual	Annual
Sierra Nevada M Co, Nev.	Annual	Annual	Annual	Annual	Annual
Union Cons M Co, Nevada	Annual	Annual	Annual	Annual	Annual
Yellow Jacket M Co, Nev.	Annual	Annual	Annual	Annual	Annual

William H. Brown, Angel's Camp, guide for stamp mills; Francisco Cavallaro, San Jose, beam and girder mill; J. J. Christensen, San Francisco, San Francisco, steering mechanism and mechanism for controlling ships' rudders; Arthur W. Coffin, San Francisco, pen and pencil holder; Edwin T. Earl, ventilator and combined ventilator and refrigerator car; Alfred T. Elford, San Francisco, ship's propeller; Michael Emme, Oakland, ground generator of electricity; Harry E. Fairman, Berkeley, water-carrying machine; William V. Gaffey, Castville, machine for cultivating sugar beets; Adolph Hintz, San Francisco, combined huller and sorer; Alexander J. McDonough, San Francisco, potato separating and grading machine; Benjamin D. McEachren, San Francisco, window hanger; David M. Miller, Fairfield, field or lawn mower; Lars Olsen, Oakland, steam roller; Mayflower Gravel M Co, California, water-carrying machine; Henry A. Shipp, Watsonville, fruit pitter; George Gates, Jackson, concentrating belt.
 Oregon—Mary E. Cook, Amity, railway car stove; Gustave A. Sachs, Eugene, breakdown, breach-loading gun.
 Washington—John E. Caterson, Dayton, car coupling; Clara T. Gott, Seattle, egg poacher.

NOTES.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

TWO-WHEELER VEHICLE.—John A. Bilz, Pleasanton, Alameda Co. No. 494,752. Dated April 4, 1893. This invention, though applicable to any two-wheeler vehicle, is especially intended for those having small wheels of any character, and particularly wheels having rubber tires, and such tires as are inflated and known as pneumatic tires which have given to racing vehicles the generally accepted term of "pneumatic sulkies." In this class of vehicles, on account of the small wheels, it is essential to obtain sufficient elevation of frame and seat; and, in effecting this, regard must be had to such a connection of axles, shafts and wheels as will give ample room for the movements of the horse, and will yield rigidity and strength consistent with lightness. To obtain these results is the object of the invention.

CHEESE-MAKING APPARATUS.—Wm. T. Armstrong, Lardo, Kern county. No. 494,973. Dated April 4, 1893. The invention relates to that class of cheese vats in which the chamber for the milk has underlying it a compartment for the water, to which heat from a suitable source is imparted. The invention consists, in connection with the milk chamber and underlying water compartment, of a novel heater for heating the water. The main object of the invention is to provide a simple apparatus or vat which may be used on as small a scale as may be desired, thus providing for its application to the uses and necessities of private families. The particular object of the invention is to provide the most simple means for heating the water, involving in its operation and use the greatest economy by reason of the conservation of all the heat, and permitting the temperature to be regulated with accuracy, thus placing within the hands of every one, skilled or unskilled, the means of making cheese in any quantities required.

CHILD'S CARRIAGE.—Eveline L. Campbell, S. F. No. 495,301. Dated April 11, 1893. This is one of that class of children's carriages in which the body of the vehicle is so constructed that it may be extended to provide sufficient length to serve as a cot in which the child may lie, and may be readily shortened again to serve as a carriage. The improved vehicle is of simple construction, and can be readily converted from a carriage to a cot, and vice versa.

BODY AND BED WARMER.—Mary A. Murphy, S. F. No. 495,427. Dated April 11, 1893. This invention relates to the class of devices commonly termed body or bed warmers and which consist of a heated vessel adapted to be placed in the bed to maintain warmth. The object of the invention is to provide a warmer, the shape of which adapts it not only to preserve its position

NOTICE OF ASSESSMENT.

GOULD AND CURRY SILVER MINING COMPANY.
 Location of principal place of business, San Francisco, California. Location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 15th day of April, 1893, an assessment, (No. 7) of Twenty-five Cents (25c.) per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 63 Nevada Block, 303 Montgomery street, San Francisco, California.
 Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1893, will be delinquent, and advertised for sale at public auction and unless payment is made before, will be sold on TUESDAY, the 6th day of June, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.

By order of the Board of Trustees,
ALFRED D. DUBROW, Secretary
 Office—No. 69 Nevada Block, 303 Montgomery street, San Francisco, California.

DELINQUENT SALE NOTICE.

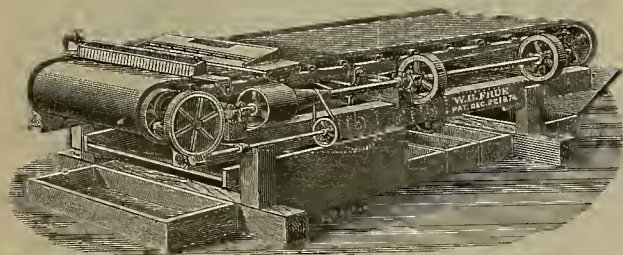
SUPERIOR MILL AND MINING COMPANY. LOCATION of principal place of business, San Francisco, California. Location of Works, Placerville, El Dorado County, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 1) levied on the 15th day of February, 1893, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Bowen, E. J.	214	200	\$ 10 00
Bullington, J. M., Trustee.	231	150	7 50
Bullington, J. M.	232	50	2 50
Callin, Dr. N.	28	50	2 50
Callin, Dr. M. M., Trustee.	191	500	10 00
Callin, Dr. M. M., Trustee.	192	200	10 00
Callin, Dr. M. M., Trustee.	193	100	5 00
Dickerhoff, F. M.	10	25	1 25
Dickerhoff, F. M., Trustee.	75	5,000	250 00
Dickerhoff, F. M., Trustee.	76	5,000	250 00
Dickerhoff, F. M., Trustee.	77	5,000	250 00
Dickerhoff, F. M., Trustee.	78	2,000	100 00
Dickerhoff, F. M., Trustee.	79	2,000	100 00
Dickerhoff, F. M., Trustee.	80	1,000	50 00
Dickerhoff, F. M., Trustee.	81	1,000	50 00
Dickerhoff, F. M., Trustee.	82	1,000	50 00
Dickerhoff, F. M., Trustee.	83	500	25 00
Dickerhoff, F. M., Trustee.	84	200	10 00
Dickerhoff, F. M., Trustee.	85	100	5 00
Dickerhoff, F. M., Trustee.	86	100	5 00
Dickerhoff, F. M., Trustee.	87	100	5 00
Dickerhoff, F. M., Trustee.	88	100	5 00
Dickerhoff, F. M., Trustee.	89	100	5 00
Dickerhoff, F. M., Trustee.	90	100	5 00
Dickerhoff, F. M., Trustee.	91	100	5 00
Dickerhoff, F. M., Trustee.	92	50	2 50
Dickerhoff, F. M., Trustee.	93	50	2 50
Dickerhoff, F. M., Trustee.	94	50	2 50
Dickerhoff, E. R.	6	50	2 50
Dickerhoff, A. J.	7	50	2 50
Douglas, Thos. E.	95	25	1 25
Evans, F. W.	8	50	2 50
Evans, Frank	16	25	1 25
Evans, Mamie	17	25	1 25
Evans, Cora.	18	25	1 25
Goodard, Geo. H., New.	26	100	5 00
Ooyan, Frank, Trustee.	37	2,000	100 00
Ooyan, Frank, Trustee.	38	2,000	100 00
Ooyan, Frank, Trustee.	39	2,000	100 00
Ooyan, Frank, Trustee.	40	2,000	100 00
Ooyan, Frank, Trustee.	41	2,000	100 00
Ooyan, Frank, Trustee.	42	2,000	100 00
Ooyan, Frank, Trustee.	43	2,000	100 00
Ooyan, Frank, Trustee.	44	1,000	50 00
Ooyan, Frank, Trustee.	45	1,000	50 00
Ooyan, Frank, Trustee.	46	1,000	50 00
Ooyan, Frank, Trustee.	47	1,000	50 00
Ooyan, Frank, Trustee.	48	1,000	50 00
Ooyan, Frank, Trustee.	49	1,000	50 00
Ooyan, Frank, Trustee.	50	1,000	50 00
Ooyan, Frank, Trustee.	51	750	37 50
Ooyan, Frank, Trustee.	52	750	37 50
Hopkins, J. P., Trustee.	138	100	5 00
Hopkins, J. P., Trustee.	139	500	25 00
Hopkins, J. P., Trustee.	140	200	10 00
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Hopkins, J. P., Trustee.	367	200	10 00
Hopkins, J. P., Trustee.	368	200	10

FRUE ORE CONCENTRATOR

OVER 8200 IN ACTUAL USE.



Price of 4-foot wide Plain Belt Frue Vanner.....\$550, f. o. b.
 " " " Improved Belt Frue Vanner..... 800, f. o. b.
 " 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.

GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l Supt. FRENCH GULCH, Calaveras Co., Cal., Dec 12, 1891.
 MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frue in order to save space and machinery. I am now running four of your six-foot machines and they have been going for twelve months. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.
 C. J. CLARK, Gen'l Supt.

For any information, or for pamphlets, or for circulars or testimonials, call on or address

H. J. SUMMERHAYES, Successor to Adams & Carter, Agent for the FRUE ORE CONCENTRATOR.
 No. 132 Market Street. - - San Francisco, Cal.

MANUFACTURERS FOR THIRTY-THREE YEARS.

CALIFORNIA WIRE WORKS

LOS ANGELES AGENCY, LOS ANGELES, CAL.

PORTLAND AGENCY, PORTLAND, OREGON.

WIRE ROPES

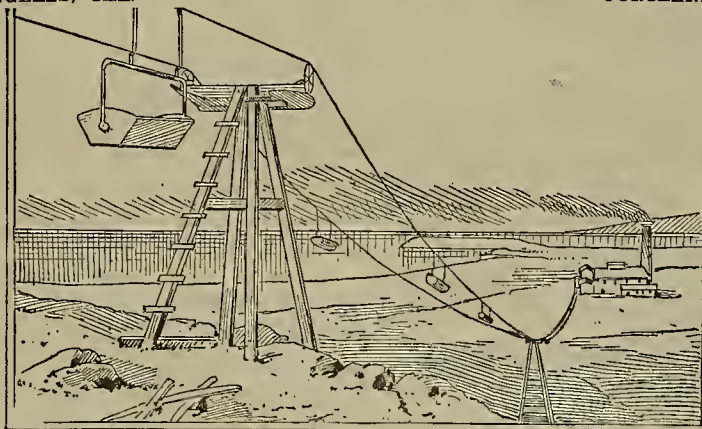
For Mining, Hoisting, Transmission of Power, Etc.

WIRE CABLES

For Cable Railways, Etc.

WIRE RIGGING

For Ships, Derricks, Etc.



WIRE of all kinds

Best Steel.

WIRE NAILS, BARBED WIRE,

Regularly Licensed.

HALLIDIE'S PATENT WIRE ROPEWAY

FOR THE RAPID AND ECONOMICAL TRANSPORTATION OF ORE AND OTHER MATERIAL.

Erected by us during the past Fourteen Years in Spans of from 200 to 2000 feet. Simple, Economical and Durable. Have been Thoroughly Tested in all Parts of the Country

SEND FOR ILLUSTRATED CATALOGUE.

Joshua Hendy Machine Works,

(INCORPORATED SEPTEMBER 29, 1882.)

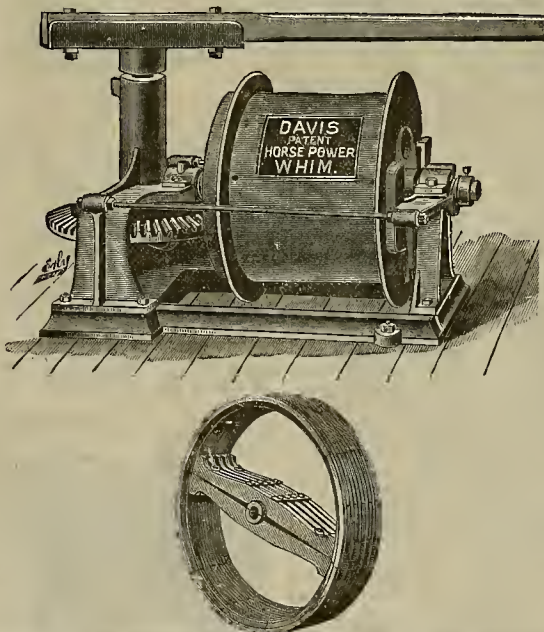
NOS. 39 TO 51 FREMONT STREET, SAN FRANCISCO, CAL.

Proprietors of the

CITY IRON WORKS.

AGENTS FOR THE SALE OF

"ECLIPSE CORLISS" ENGINES.
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 "ECONOMIZER" BOILERS AND ENGINES.
 "ERIE ENGINE WORKS" BOILERS AND ENGINES.
 "CLIMAX" BAND-SAW MILLS.
 ROTARY AND CENTRIFUGAL PUMPS.
 BUFFALO DUPLEX STEAM PUMPS.
 GARLOCK'S ELASTIC SPIRAL PACKING.
 "REEVES" WOOD SPLIT PULLEYS.
 "SENSIBLE" HORSE-POWER WHIMS.
 STEAM HOISTING WHIMS.
 MACHINISTS' TOOLS OF ALL STYLES
 FOR ALL WORK.



Manufacturers of NEW and Dealers in
 SECOND-HAND

BOILERS, ENGINES, PUMPS AND MACHINERY

OF EVERY DESCRIPTION.

HYDRAULIC MINING MACHINERY.
 QUARTZ MILLING MACHINERY.
 SAW MILLING MACHINERY.
 HYDRAULIC GRAVEL ELEVATORS.
 HYDRAULIC GIANTS AND GATES.
 AUTOMATIC ORE FEEDERS.
 "TRIUMPH" ORE CONCENTRATORS.
 MINE AND MILL SUPPLIES.
 BELTING (LEATHER AND RUBBER).
 LUBRICATING COMPOUNDS.
 WATER PIPE, ETC., ETC.



WORLD'S FAIR REDUCTION.

San Francisco Pioneer Screen Works
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SAN FRANCISCO, SATURDAY, APRIL 29, 1893.

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A Horizontal Refrigerating and Ice Machine.

The engraving on this page shows the horizontal refrigerating and ice machine shipped recently by the Vulcan Iron Works of this city to the Gambrius Brewing Co. of Portland, Oregon. It is of 35 tons capacity. It is what is known as a horizontal double-acting compressor and is driven by a Corliss engine, with latest improved valve gear. The valves of the compressor have some special features, making them very convenient to get at and also very durable, being all made of machinery steel. The machine is run on the minimum amount of clearance in the cylinders. The expansion of the piston rod is taken up by the cool circulation of oil through a chamber in the stuffing-box. There are no bolts used in the stuffing-box, which is a double one, being taken up with a screw cut around the circumference, thus insuring perfect alignment of both stuffing-boxes on the piston rods. The cylinder is water-jacketed, and all the working parts, pins, journals, etc., on both engine and compressor, are made entirely with genuine Babbitt metal, the bearings being extra large. The cross-head is of special design, most conveniently arranged for taking up the wear on the slide; the slides are fitted with genuine Babbitt metal.

The engine is an extra heavy one, suited to the severe character of its duty. All the pins on the engine have adjustable brasses, and the governor is a high-speed one, arranged with counter-balance so that the speed of the compressor can be reduced one-half. The fittings and valves on this machine and on the ammonia piping connected with the plant, are of the Vulcan Works design, and their character may be judged from the fact that when the plant started up the other day, with an air-pressure of 300 pounds, there was not a single leak anywhere. Neither were any of the bearings heated. The plant is now in successful operation at Portland, and is the first of its kind put in operation on the coast. While designed mainly as a refrigerating plant, part of its extra capacity will be utilized in making about four tons of ice a day. Different sizes of this same style of machine are made by the Vulcan Works. In this horizontal type there is no necessity of a platform as in a vertical machine, and the attendant does not have to climb to get at the valves, etc. The new design is particularly adapted for the larger sizes of refrigerating machinery. The Vulcan Works are making a specialty of refrigerating plants and ice machines and have been very successful in their work,

not only on our own coast, but in British Columbia and Central America. Breweries, canneries, packing companies, markets, etc., have been fitted out by them, and they have various designs suited to special requirements.

AFTER several years of inactivity, work is again to be resumed on the placer ground at Picacho, 30 miles north of Yuma. A company has lately been incorporated at Los Angeles called the California Picacho Mining Company, composed chiefly of English and California capitalists, who intend to put in an extensive plant at Picacho. About four miles of 12-inch pipe will be required to convey the water from the river to the gold-bearing ground.

The Gates Concentrating Belt.

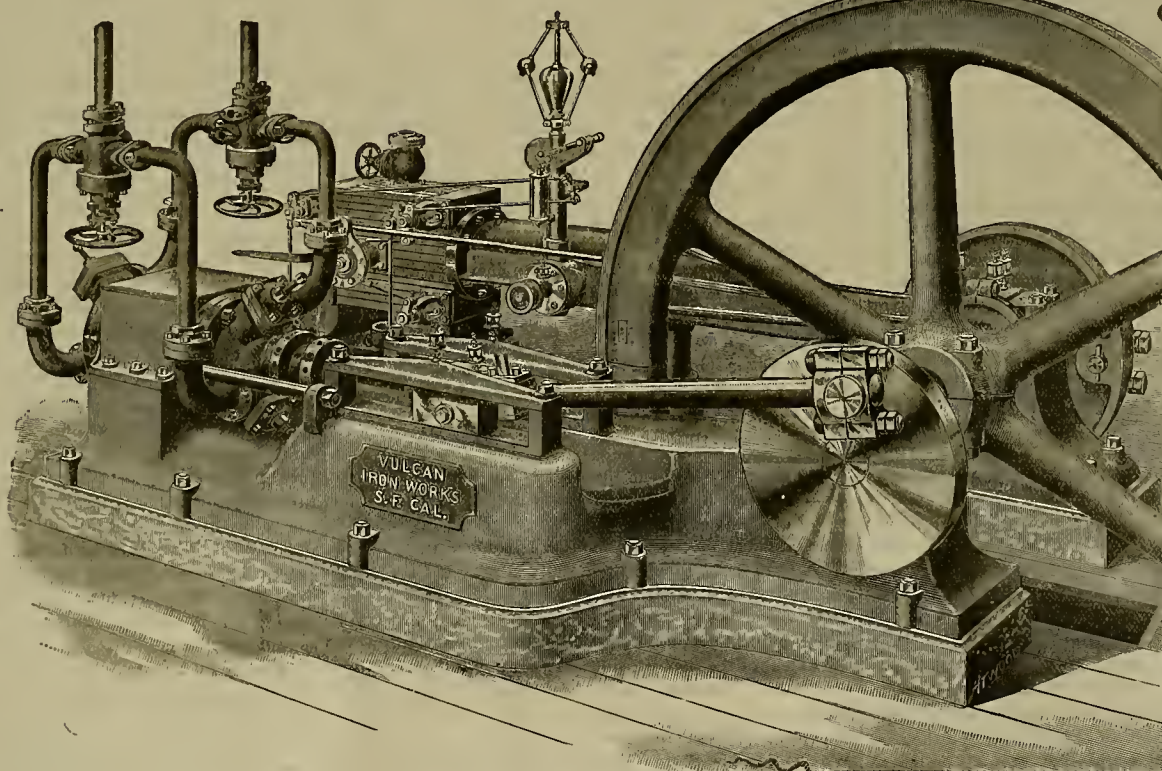
George Gates of Jackson, Amador county, has just received through the MINING AND SCIENTIFIC PRESS Patent Agency a patent for an improved concentrating belt to be used on belt concentrators for saving sulphurets, etc. The object of concentrating belts is to provide a surface over which the pulp is allowed to flow, and upon which the heavier and more valuable portions will settle and be detained during this flow. The belt is usually mounted upon rollers at a slight inclination and is caused to travel up the incline toward the source of supply, so that the arrested particles are carried over the roller at the upper

end and are then washed off from the lower side of the belt, thus making the operation continuous. The belt is usually agitated in different ways to give it a shaking motion for the purpose of adding to its efficiency, these features being common to all concentrating belts. These belts are made of various materials; canvas and rough burlaps have been largely used, and also rubber belts with various forms of corrugations and pockets into which the concentrates are intended to settle and be retained. The objection to the canvas is that the constant action of the water soon renders it slippery and slimy and causes it to swell so that the surface does not hold concentrates and much is lost, in addition to which

the material soon becomes destroyed and must be replaced.

In the various forms of rubber belts the pockets or corrugations are made so deep that with the comparatively small quantity of sulphurets contained in any given stream of pulp, there will not be enough sulphurets to fill these corrugations, and consequently a considerable quantity of valueless sand will be retained and the separation of the sulphurets will not be as perfect as desirable. Mr. Gates in his invention employs a rubber belt which is formed with a closely pitted upper surface over which the material will pass.

The pitted portions are practically in series and have connecting necks and flanges which are produced by reason of the alternate arrangement of the pits and the depressed or pitted condition of the surface of the belt. This arrangement produces practically a series of fine channels through which the pulp passes and is claimed to be very effective. An improved form of edge flange for the belt is also covered by this patent and the inventor says this flange will not crack or break with long and continued use.



VULCAN HORIZONTAL REFRIGERATING AND ICE MACHINE, THIRTY-FIVE TONS CAPACITY.

The company expects to expend \$75,000 on its pump, pipe line and other necessary machinery.

JOHANNESBURG, in the Transvaal, South Africa, is a wonderful little town. It is but five years of age and the inhabitants number 40,000. It stands upon a gold reef, and upon this reef 50 companies are at work giving employment to 3370 white men and over 32,000 natives.

A NUMBER of Colorado capitalists have located a placer claim on "Old Baldy" mountain, San Bernardino county, 2000 feet below the peak. The operations will be on an extensive scale. A large pipe-line will be laid to carry water for hydraulic mining.

THE Klamath river miners are all busy at present putting in wing-dams, or making preparations to do so, and expect to have a very successful season this year in taking out great quantities of gold-dust.

THE Osceola Gravel Company, Nev., expect to employ about 100 men this season.

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W. B. EWER, }
CHAS. G. YALE, } EDITORS

Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, April 29, 1893.

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Comment.

After Monday next, May 1st, the penalty clause of the Caminetti law comes into force. This provision is: "Any person or persons, company or corporation, their agents or employes, who shall mine by the hydraulic process directly or indirectly injuring the navigable rivers of the United States, in violation of the provisions of this Act, shall be guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not exceeding \$5000, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court." Another section of the law provides that hydraulic mining, carried on in the territory drained by the Sacramento and San Joaquin river systems, other than as permitted under the provisions of the Act, is prohibited and declared unlawful. Miners will do well to bear these important provisions in mind, and not risk punishment by attempted violation of them. Some injustice is being done to the mining community by the delay in appointing the commission whose duty it is to issue licenses to mine under this Act. While the dispatches a month since announced the appointment of certain U. S. army engineers of this city, inquiry at their offices develops the fact that they have as yet received no official notification of their appointment. After such notification, they have 30 days to organize and an indefinite time to formulate plans. Hydraulic miners who have been in this city during the past two weeks to see about licenses find there is no one to whom they can apply. Therefore, though the penalty clause comes into effect in a few days, they can obtain no licenses to comply with the law. All they can do is to wait. The State Miners' Association foresaw this difficulty and tried to have the bill amended so as not to come into effect until the commission was appointed and ready to grant licenses, but this they were unable to accomplish. It would have been, however, simple justice. Now, no man can well comply with the law and continue to mine, unless he already has restraining works which keep everything but the water out of the streams. Several miners are ready to put up works, but are unwilling to do so without previous consultation with the Debris Commissioners. So far there are no Debris Commissioners, though there is a law to punish miners for not getting their permission to mine. We should not advise any miner to work any hydraulic claim not already provided with restraining works, without consulting his attorney, no matter how far his mine is from a navigable stream. Even where he thinks he is doing no damage, anti-debris people might think differently and get him into trouble.

The Trans-Mississippi Congress is in session at Ogden this week. Up to Thursday, most of the time had been occupied on the silver question, and a resolution adopted

asking the directors of the World's Fair to set apart a day in September to be known as Silver Day, when addresses on the subject of silver coinage can be delivered and the day otherwise be celebrated in an appropriate manner. The delegation from this State went with a simple and definite policy. The Nicaragua canal, the improvement of the San Joaquin and Sacramento rivers, deep-water harbors for Los Angeles and San Diego, and a fair appropriation to carry out the hydraulic mining law are the only demands, and on these all were agreed. Mr. H. Weinstock of Sacramento is chairman of the delegation and Julian Sontag, secretary. Mr. Sontag was subsequently elected secretary of the Congress. He is one of the two delegates sent by the California Miners' Association. There is little doubt that the Congress will agree to all the propositions to be introduced by the Californians.

Since writing the above we have received a dispatch (Thursday) stating that the Congress adopted unanimously the California resolutions recommending Congress to make an appropriation toward building dams to hold back mining debris.

THE Union Iron Works people ought to feel proud of the many compliments paid to the cruiser San Francisco while participating in the naval display at Hampton Roads with vessels from all nations. The vessel is of American design and was built in this city by California mechanics. In going from here to New York, on the first 13 days of the home run the San Francisco burned 107 tons of coal less than the Baltimore and 45 tons less than the Charleston. This proportion was maintained to Hampton Roads, where the official record of the trip shows the San Francisco burned \$10,000 worth less coal than the Baltimore and much less than the Charleston. The San Francisco needed no repairs; the Charleston needed some new boiler tubes; the Baltimore was sent to the Brooklyn Navy Yard for general repairs. Admiral Hopkins, of the British fleet, pronounces the San Francisco the finest vessel in the fleet, not only in her appearance but in her armament, finish and the personnel of her officers and crew. The same gentleman, by the way, says the silver service presented to the ship by the citizens of San Francisco the most magnificent he had ever seen. This, too, is of California manufacture, having been designed and made here by Geo. C. Shreve & Co. The crew of the San Francisco have covered themselves with glory in the boat races by winning every one they entered, beating the sailors of the combined fleet. The boats had something to do with this, which is a compliment to our Navy Yard at Mare Island, where they were built. Martin Vice, of this city, was foreman of the Mare Island boat shop when the boats were built. The San Francisco has attracted so much favorable attention since she went East that she has proved a good advertisement for the city after which she is named and for the mechanics who constructed her.

San Francisco is not in these days easily excited by a mining discovery, but because, in excavating a lot at the corner of Devisadero and McAllister streets, a man found some cinnabar ore, several thousand people have thronged around the spot to look at the "city mine," and the daily papers have been filled with detailed descriptions of the find. Some of the ore is said to be very rich and to carry a high percentage of metal, but nothing is yet known of the extent of the deposit, since only a 12-foot "shaft" has been sunk. Cinnabar ore has been found in several places before this on this peninsula, but nothing ever came of the mines. It was found on the Potrero years ago. Prof. Whitney, in his State Geological Survey Reports, mentions the discovery of small quantities of cinnabar ore and mercury in early days near the Mission, in the serpentine rocks. In fact, small irregular deposits have been found near Berkeley, at Point Reyes, and in Santa Clara, Napa, Sonoma, Lake, Colusa, Yolo, Fresno, Santa Barbara, San Luis Obispo, San Benito, Marin, Solano and Trinity counties. A very small proportion of the deposits found ever proved to be of any value. In 1874 and 1875, when quicksilver was very high, production was stimulated and many deposits discovered. None of those found grew richer in depth. If this deposit had been struck outside of the city, little attention would have been paid to it unless development proved it of some value. But, being within city limits, and widely advertised as something remarkable, the importance of the find has been magnified. At the same time, there is nothing strange about it, for the serpentine rocks in which the metal occurs run through the peninsula, and, as stated, similar finds have been made here before.

SMELTING WORKS are to be put up at Marietta, Nev., for the accommodation of the silver-lead mines of the district.

THE Kennedy quartz mine, Amador county, cleaned up \$65,000 last month.

Improvement in Comstock Mill Returns.

We have repeatedly claimed in our columns that the ores produced by the mines located on the Comstock were either carelessly worked, or, that the mills converted to their own use the bullion produced, which should have gone to the mining company whose property yielded the ore. The Mining Stock Association has made a persistent fight to compel the mills to return to the ore-producing companies the proper percentage, and the result of the agitation of the matter by them and others is shown by the results of the working of the Consolidated California and Virginia and Potosi ores for the month of March, 1893. During the month of March the Consolidated California and Virginia sent to the mills of the Comstock Mill Company 3625 tons of ore. The average car sample of this ore was \$30 46 per ton, and the average battery sample \$27 43, showing a difference of but \$3 03, or ten per cent. The bullion returns for the month are 2463 tons, for which there was returned, gross bullion, \$59,062, or \$23 98 per ton. This is 73.72 per cent of the car sample value, and 87.42 per cent of the battery sample value. These percentages have not been equalled on ore from the Consolidated California and Virginia since Senator J. P. Jones had the contract to crush the output of this mine. At that time he was crushing the ore under a contract with Messrs. Mackay and Flood, the latter having no interest in the mills. They compelled Jones to give them a railroad car sample assay, a mine sample assay, and a pulp or battery assay. The numerous checks on the mill resulted in returns up to 95 per cent of the battery sample value. When the Comstock Mill Company was formed, and Flood and Mackay became part owners in the mills, this was changed, and the returns to the company were much less than under the Jones contract. Under the Jones contract the Consolidated California and Virginia received the proper returns from the mills. Under the Comstock Milling Company's work the ore was systematically looted, and the bullion appropriated, as shown in the evidence in the Hale & Norcross suit.

The returns from the Potosi Company for the month of March are a trifle better than those from the Consolidated California. This company sent to the Nevada Mill 2258 750-2000 tons of ore during the month. The average car samples of this was \$27 67 per ton and the average battery sample value \$24 77, showing a difference of but \$2.90 per ton, or a trifle over ten per cent. The bullion returns for the month are on 1888 tons, for which there was returned gross bullion \$41,300 98. This is 79 per cent of the car sample value and 88.3 per cent of the battery sample value.

The Consolidated California and Virginia reports a profit of \$9000 for the month of March. When it is considered that out of this amount about \$4000 is represented by the check which the Comstock Milling Company returned to the mining company, because they had not returned the proper per cent of the ore crushed, the effect of the agitation for honest milling can be appreciated. It is to be hoped that this is the dawn of a new era on the Comstock. There is no reason why that country should not be prosperous. There is plenty of ore which will pay for crushing but it must pay the shareholders in the mines not the shareholders in the mills. The greatest good to the greatest number would be carried out in this way and instead of a finely pampered and dissipated millionaire millowner we would have hundreds of comfortable citizens with homes of their own. We hope that the much needed reform in the management of the Comstock has commenced, but we know that an atmosphere that will absorb bullion is very demoralizing, and there is no telling whether the change is permanent or not. However, the bullion record never lies and if the millowners have not reformed that record will soon tell the story. It is worthy of remark that the mill that returned 78 per cent to the Potosi Company is the same one that could save only 30 per cent for the Hale & Norcross.

F. MAHLER, a machinist by trade, 276 Minna street, showed us last week an unbroken steel shaving nearly sixty feet long, half an inch wide and about a hundredth of an inch in thickness. It was cut while turning a crank pin in 1891. It is of the finest quality of steel and must also have been a good lathe hand who made the shaving. It is rolled in a small coil to be exhibited at Chicago.

THE designer and architect of the new ferry building at the foot of Market street, which is illustrated on page 261, is A. Page Brown, to whom we are indebted for the photograph from which the cut is made.

WHILE southern Esmeralda (Nev.) silver camps send out gloomy reports, Pine Grove, in northern Esmeralda, with its gold ledges, is looking up.

Foundry Notes.

THE action of the Canadian Government with relation to the admission of mining machinery into British Columbia is not looked upon with favor by American mining machinery manufacturers, or, for that matter, by British Columbia miners. It has been evident from the time the law making mining machinery free was first enacted, and made to contain the clause "if not manufactured in Canada," that the benefit it would be to the miners of the country would depend altogether upon the manner in which it should be administered. The Quebec Mining Association, at a meeting recently held at Montreal, received a report from a committee appointed to interview the Controller of Customs. The law provided that the oath of the importer should be sufficient evidence as to whether any machine was manufactured in Canada or not, but in practice it was found that the customs officers pleased themselves whether the oath should be accepted or not. This Department had even provided itself with a list of machinery drawn up by the head of an interested manufacturing firm, all of which, it was alleged, was manufactured in Canada, and included in the list was every machine from a "jig" to the most elaborate modern and costly crushing or drilling machine. The company did not by any means make every class and kind of machinery in existence or that might be required, and some which they did claim to make took a whole year to manufacture, and after waiting that length of time the purchaser was made to pay, in addition to the American price of the machine, the full amount of the duty, which would sometimes be \$800—the American price and the duty being the Canadian price of the machine.

The law enacted three years ago had the earnest support of the members of Parliament from British Columbia. And when it was renewed and extended for another period of three years at the late session, Mr. Barnard advocated the free admission of all machinery used in mining. This should have prevailed, but the Eastern manufacturers were too powerful with the Government, and would not permit it. A good deal of the machinery wanted by miners in British Columbia cannot be furnished by Canadian firms, because they are made under patents owned by American manufacturing firms. The Canadian firms can make the old machines, on which patents have run out, and which have been superseded by later and better inventions, but the miners do not want them and ought not to be compelled to use them or suffer by paying a high duty on the better imported article. The present condition of affairs is bad for the British Columbia miners, especially as that region is being rapidly developed, and new plants are being ordered and built. San Francisco foundrymen are interested in the matter to some extent, as machinery can be shipped from here readily, and more would be ordered were the revenue laws more favorable.

THE Joshua Hendy Machine Works report an increasing demand for hydraulic nozzles for gravel mining. About a dozen orders sent in recently are for plants in northern California, Idaho, Colorado and Arizona. No special demand is noted from the older hydraulic mining regions of California which dump into the tributaries of the Sacramento or San Joaquin. In those older sections the claims which can operate are already equipped, but most of the mines are closed down and will remain so until the Government Commission is ready to issue licenses to mine by the hydraulic process.

THE Champion Mining Company has purchased a new pumping and hoisting plant from the Union Iron Works of this city and the machinery will shortly be shipped to Nevada City. It will be one of the heaviest plants of its kind in Nevada county. Wm. May of Grass Valley will have charge of the business of erecting the new works and the preparations for receiving the new and elegant machinery have already been commenced. The machinery to be placed on the mine will be able to work to the depth of 3000 feet. The Champion is looking well and fully justifies the management in making the large outlay in the new improvements.

THE City Trustees of Oceanside have located a diverting point upon the San Luis Rey river near Pala, twenty miles from Oceanside, and will commence diverting the water at once. Lew Harris is the engineer in charge. The city recently voted \$30,000 in bonds, and with this and subscription from the English syndicate at Montserrat water is to be secured for the city and intermediate lands. This is another big job for makers of iron pipe. There is great competition, however, in this line. In the case of the new Vallejo Water Works bids were offered for lap-welded pipe at lower prices than the engineers' estimates of ordinary pipe.

A NEW gas-holder for the new gas works at North Beach has just been completed by the Union Iron Works. It has been tested and proved to be very satisfactory. It is one of the largest on this coast and is capable of containing 2,000,000 cubic feet of gas. The circumference is over 500 feet and in height 180 feet. The basin in which it was constructed is 40 feet deep and is capable of containing 5,000,000 gallons of water.

Now that the suit of Bateman Brothers against the Harbor Commissioners has been decided adversely to the plaintiffs, there will be no further delay in commencing the work of construction of the ferry building at the foot of Market street. The foundations are to be somewhat modified, that is to say, the piles will be cut off at 21 feet 6 inches below city base, instead of 25 feet 6 inches as originally intended. This will be a saving in concrete and will reduce the cost of the foundations. Whether these footings or piers for the entire structures will be built now or at a later date will depend much upon the estimates. A drawing of this building is shown on another page. The structure is to cost \$600,000 aside from the expense of the foundations.

Coast Industrial Notes.

AT Lime Point the ground has just been broken for the concrete mountings of two twelve-inch guns.

TRACK-LAYING on the new Mission-street electric line in this city has been completed to 29th street.

A SMALL monument of black marble from a quarry in the South Yuba river, is to be shipped to the World's Fair.

THE Santa Fe, Prescott and Phoenix railroad is completed, and the first train ran over the road from Phoenix, A. T., on Monday.

TO SECURE 200 bonds of \$1,000 each the Highland Park and Fruitvale railroad, Alameda county, has executed a mortgage on its plant, franchise, etc.

THE bonds issued by San Joaquin county to provide money for the erection of the fine new County Hospital have been sold for \$51,000, which was at \$1000 premium.

SEVERAL COMBINATION CABLE CARS, of the same pattern as those recently placed on the Geary-street road, have been added to the rolling stock of the Valencia-street line.

SAN ANDREAS, in Calaveras county, is to have a fire-proof brick, stone and iron Hall of Records. William Mosser of this city is the architect, and the cost will be about \$15,000.

OF the \$125,000 bonus promised the Metropolitan electric road by property-owners, to secure the extension of the line through lands south of the park to the ocean, \$50,000 is reported pledged.

THE Board of Improvements at Mare Island Navy Yard is making an exhaustive research. Their report to the Secretary of the Navy will be a voluminous one, embodying all the details and possibilities to make the yard worthy of the coast and nation.

DEPUTY LABOR COMMISSIONER O'BRIEN, who for several weeks has been trying to ascertain whether the sweating system exists in the factories of this city, finished his labors on Saturday and reported to his chief that there are no sweaters in this city outside of Chinatown.

THE big blockade on the South Pacific Coast road, caused by the landslide at the tunnel near Wright's, has been raised and the road is now in operation all the way to Santa Cruz. The summer-tours schedule has been put into effect, including Sunday excursion trains to Santa Cruz.

OAKLAND is to have a co-operation of hackmen. The electric roads with terminals at nearly every depot and stopping place in the city, have cut into the hackmen's business to such an extent that some movement is necessary for their self-preservation. They say business is not paying while expenses go on as usual.

THE contracts for a city hall, four miles of water mains and a complete fire alarm system have been signed by the city trustees of Hanford, Tulare county, and work on these improvements will commence at once. The improvements will cost \$30,000, bonds for which have been sold. The town has also a \$60,000 opera house which was formally opened on Monday night.

THE Truckee Republican says that the work of cutting ties for the new railroad to Lake Tahoe has already commenced, and in a few days the woods will be full of workmen. The snow is too deep yet to commence taking up the track of the Burckhalter railroad, preparatory to transferring it to the line of the Donner & Tahoe line, but all the preliminaries are being made.

THE Colorado Fuel and Iron Company's iron mines at Newcastle, Colo., are on fire, and the prospects are that it will take at least two months to extinguish the flames. The fire is supposed to have been caused by the ignition of gas. Nobody was injured, but the loss to the mines will be heavy. They are the largest in the West. A large number of men are out of employment.

THE Oregon Pacific Railroad Company will attempt to foster a new industry, the bringing of fir firewood to San Francisco for a market. The corporation finds that it can transport the wood at a very small cost, and as there is a large demand for fuel of that nature here, the company's steamer Willamette Valley will bring down with her this trip several hundred cords as an experiment.

EUREKA PARTIES are preparing to put a proposition before the Oregon Pacific for the extension of a line to Humboldt to connect with the proposed coast road to San Francisco. As a consequence of active competition in Oregon for the business of Willamette Valley, the Oregon Pacific people are bringing an unusual amount of wheat to San Francisco; 620 tons will come by the company's next steamer.

W. G. CURTIS, Assistant General Manager of the Southern Pacific Company, says that the company intend to remove its division shops from Terrace to Ogden, and put up new shops at the latter place that will give employment to over 200 men. The buildings for the shops and round-houses are to cost \$60,000, and the people of Ogden have raised \$20,000 as an inducement to the company to put the shops there.

HARBOR COMMISSIONERS BASSETT, COLE AND BROWN, accompanied by Chief Engineer Holmes, made an inspection last Thursday of the various methods of pile protection used in the harbor. At Tiburon piles prepared by the Paraffine Paint Co.'s process from five to eight years ago were found in a splendid state of preservation, while uncoated piles driven less than a year ago were entirely eaten away. The same was found true at Angel island and other points visited.

A TELEGRAM just from San Luis Obispo states that the Pacific Coast railroad will be at once pushed on from its present terminus at Los Olivos to Santa Ynez, four miles further south. It is generally believed that the road will soon be incorporated as a part of the Southern Pacific system, and this order would seem to indicate that the much-mooted question of the exact route to be taken by the latter road through northern Santa Barbara is by Santa Ynez

and Gaviota pass instead of by way of Lompoc, as has been generally supposed.

THE pressing need of a dredger and steam tug is continually felt at the Mars Island Navy Yard. An appropriation of \$20,000 has been made, which will become available after July, for dredging along the water front. There is some talk of pumping the mud up and depositing it on the tules between the sawmill and where the Independence is lying, so that some day the place may be filled in and a line of quay wall be built for this purpose of having additional room for ships to lie alongside.

THE new works of the San Francisco Gas Light Company, situated at the corner of Bay and Buchanan streets, are rapidly nearing completion. A large force of laborers and mechanics are engaged in placing the machinery in order and in finishing the few outbuildings. The new gasholder is the largest on the coast, being 180 feet high and 500 feet in circumference. The retort, generator, exhaustor, purifying, office, meter and scrubber buildings are almost completed and fitted up with all the modern equipments necessary for conducting such an extensive gas works as this one is.

ARTICLES of incorporation of the Plungs Creek Water Company have been filed with the County Clerk of San Bernardino county. The incorporators are: H. J. Waters, A. E. Sterling, E. G. Judson, James G. Clark, F. G. Brown and others. The amount of capital stock is \$100,000 all of which has actually been subscribed. The principal place of business is Redlands, California. The object of the corporation is to buy and sell water for the irrigation of a large tract of land in Highland, near the city, and to develop power for electric lighting and manufacturing purposes. The stockholders are well known as the founders of the Bear Valley irrigating system, and the new company proposes to push developments at once.

JUDGE M. P. O'CONNOR has transferred his magnificent mansion at the corner of Second and Resed streets, San Jose, to the sisters of the Notre Dame College for a technical school. The transfer was made several weeks ago, and the sisters will take possession of the mansion in about two months. There were no terms accompanying the donation, except that it should be used for the caring of orphans, and poor and destitute children. Sisters from the Convent of Notre Dame will manage this new institution. All children who are raised by the Catholic societies will be placed in this school, and they will be given a good education. They will also be taught to cook and sew and do other household work.

THE Russian Finns, who constitute over one-third of the fishermen of Astoria, Or., are talking of forming a second fishermen's union in opposition to the one at present in existence, which is composed mainly of Scandinavians. The former, if they combine, will work under the rate of \$1.15 per fish. Up to this present the salmon catch has been very slack, and 40 per cent of the fish captured are of poor color and average about twenty-one pounds in weight. Up to the present time the five cents per pound now being paid by the canners has worked against the men, as all packages of fish has been under weight. However, the runs of the latter part of May and June will no doubt bring far larger fish. Some of the cannerymen are holding off until that time, when they will crowd into the spaces of seven weeks all the work the capacity of their places can possibly handle.

THE San Francisco and San Mateo Railroad Company secured an injunction on Monday to prevent any interference with its plant pending the final determination of the replevin suit filed last week by the Thompson-Houston Electric Company. Had it not been for the injunction, it was the intention of the electric company to have seized all the machinery, cars, dynamos, etc., of the railroad because of alleged non-payment of a part of the purchase price. The railroad company admits the existence of this debt, but charges that the money is owing from the S. S. Construction Company, by which latter corporation the road was built. The railroad alleges that, aside from its bonded indebtedness, it owes only \$32,000; also that the road is in a flourishing condition, its earnings now averaging more than expenses and interest on the bonds, and are constantly increasing.

THE work of building an electric railroad from Mayfield to the Stanford University will begin in about three weeks. The storage-battery system is to be applied on this line. The owners of the franchise are Messrs. J. M. Louks and C. F. Hayne. The name of the corporation is the Mayfield and Stanford University Electric Railroad. The route is from the Southern Pacific depot at Mayfield up Lincoln street to Yala street in College Terrace, thence through Palo Alto avenue to Bowdoin street, thence to Mayfield thoroughfare to a point opposite to the quadrangle of the classrooms. This is as near as Senator Stanford will permit any company to approach the university. He has announced his purpose to lay a track from the quadrangle to the Mayfield thoroughfare, a distance of about a quarter of a mile. The company will be permitted to run their cars over this track to this quadrangle. The new electric road is built for the accommodation of those students who reside in Mayfield and College Terrace, and those who desire to reach the former point to take the cars either for San Jose or San Francisco.

THE motemen and conductors of the various electric lines of Oakland and vicinity are about to organize a union. The roads have spread out so extensively in the past few years and the town has grown so rapidly along the lines that many cars are necessary, and perforce, many men are needed to operate them. For instance, the Oakland Consolidated road, with its 23 miles of track, operates 24 cars, and employs 100 men; the Telegraph Avenue line has 11 miles of track, runs 15 cars and employs 75 men; the Consolidated Piedmont, 4 miles of track, runs 5 cars, and employs 25 men; the Oakland, San Leandro and Hayward road has 20 miles of track, runs 12 cars, and employs 60 men, and the Vandercook Sessions line has 8 miles of road, runs 8 cars, and has 40 men. Here are over 300 men employed as conductors and motemen, and they feel that an organization among themselves would be to

their advantage in many ways. Each car has two shifts of men, or four to a car, the day men working 11 hours and the night shift 7, with wages 21 cents per hour. This is the case on all the roads except the Telegraph Avenue line, where the men receive 22 cents per hour, but their hours of work are so arranged that the wages aggregate about the same as on the other lines.

KNIGHT & Co. of Sutter Creek are making a big rock-breaker for the county for road-making purposes. The piece of machinery consists of an ordinary rock-breaker, mounted on a heavy truck with four wheels. The breaker is fed by elevators from both sides, and the broken rock is discharged into another elevator which carries it up and dumps it into carts or wagons without handling; or, if it is to be dropped on the road where it is broken, it is separated into three grades, the coarsest falling first, a finer grade falling on top of that and the finest coming out last. The power is furnished by a gasoline engine which, with a water tank, is carried upon the trucks. The power of the engine is conveyed to the rock-breaker, the elevators and the truck at the same time; thus, as the rock at the side of the road is put in the elevators and crushed the forward movement of the entire machine distributes it regularly over the surface of the road. Its use in this manner necessitates the placing of rock not to exceed ten or twelve inches along the side of the road, where they can be fed into the elevators without loss of time.

A BIG LUMBER YARD enterprise is to be started in San Francisco within a few months. It will be a lumber yard on a colossal scale, such as San Francisco has never seen before and will have an appreciable influence in regulating the price of lumber in San Francisco and vicinity. John Polson, the famous lumber king of the northwest, has been in town for some time past until a few nights ago, when he left for Portland after accomplishing his mission. The nature of the business that brought him to San Francisco has now been learned. Mr. Polson is a member of the firm of Inman, Polson & Co., of Portland, Or., which practically controls the lumber market of the Pacific Northwest. The firm not only has extensive lumber yards there but is interested in a number of large sawmills. The firm now proposes to make San Francisco a market for the output of its mills and Mr. Polson has been negotiating with James G. Fair for a lease of a large section of land at Harbor View. The site selected has a deep-water frontage and it is understood that Senator Fair will have a wharf built out into the bay at which the lumber-laden vessels from the north can dock and discharge their cargoes. This is not the only scheme which the big lumber kings have in prospect. They intend to open another large yard on the Oakland side of the bay and have something to say about furnishing the Oakland market with lumber.

Quartz Locations in Placer Claims.

The Butte (Mont.) *Inter-Mountain* says:

The quartz vs. placer lawsuit which was on trial in Judge McHatton's court this week came to an abrupt termination yesterday, the court deciding in favor of the plaintiffs in the case. Any decision in this character of lawsuit is of more than ordinary interest in Butte, as many controversies between quartz and placer titles are pending in the court. This was an action brought by the plaintiffs to quiet their title to the South Star lode.

In this case the plaintiffs were N. J. McConnell et al. and the defendants John Noyes et al. The plaintiffs claimed under a location of the South Star lode made December 2, 1878, the ground in controversy. Defendants claimed it under a placer location made prior to that date, upon which application for patent was made December 17, 1878. A placer patent issued in 1880. Plaintiffs introduced evidence to prove a discovery of a lode or lead, containing precious metals within the South Star boundaries, at the time of its location; and to prove their compliance with the United States statutes by marking the boundaries on the ground so that they could be readily traced, and by filing for record with the recorder of the proper county the notice of location in accordance with law; also to prove that they and their predecessors in interest had been in possession and engaged in working and developing the claim. After this they rested their case.

Thereupon the defendants offered in evidence the notice of location of their placer claim and contended it was admissible in evidence to prove that the location of their placer claim was made prior to the quartz location, by the plaintiffs; and that their placer claim was an existing claim at the time of the alleged quartz location of the South Star; and that this being true there was a grant by the government to them of the ground in question; and that if the same did contain a quartz lode the plaintiffs nor any one else could make a valid location of the same until the defendants had made their application for the placer patent and had failed to include in said application an application for the quartz lode. The plaintiffs objected to this.

The court held that a location of a placer claim operated only as a grant of placer ground, and that anybody had a right to go upon the placer ground and make a valid location of any quartz lead or lode found within the boundaries of the placer claim not claimed or possessed under the law by the owners of the placer location or any other person.

The defendants then offered in evidence their application for placer patent, and the patent itself, which were objected to, and the objection was sustained by the court which held: The question to be determined in this suit, was whether or not the plaintiffs had discovered a lead or lode, within the ground on or before the second day of December, 1878, and had made a location thereof in accordance with the requirements of law; and that if they had, that it operated as a grant by the government to them of the ground within their location and was excepted out of the placer patent. The application for the patent and patent itself, being subsequent in date to the plaintiff's location, were entirely irrelevant and immaterial and did not tend in any manner to disprove the quartz location by the plaintiffs. The

court further held that the evidence in a case of this character must be directed to disprove the quartz location. The defendants made several offers to prove, in line with their former offers, which were ruled out. The jury was directed to return special findings in favor of the plaintiff.

Yellow Pine District, Nevada.

A Virginia *Chronicle* reporter had an interview with J. V. Keeley of San Francisco, who was paying a short visit to Comstock friends. Mr. Keeley was formerly local agent of Wells, Fargo & Co., at Pioche, and was also located at Eureka, this State. He is interested in mining property in Yellow Pine, which is located in the extreme southern end of Lincoln county, Nevada. Mr. Keeley has but recently returned from a trip to that locality, and is imbued with the belief that Yellow Pine in the near future will astonish the world, as it abounds in rich minerals, principally gold.

Yellow Pine district is six miles east of San Bernardino county, the altitude above the sea level being 4900 feet. The gold belt covers an area of twenty miles, while minerals are found in large quantities within a radius of 100 miles. The gold belt is surrounded by mountains of galena ore, averaging from 2 to 60 ounces silver, and 80 per cent galena. There is a timber belt within twelve miles on Potosi mountain and numerous living springs of water. There are several good mines being worked in the district, and hundreds of locations already made. The country rock is lime, the capping on the surface generally ranging from two to ten feet deep. The gangue of the ores of the gold claims is generally found in red oxide of iron, interspersed with copper, a very favorable indication of permanency. The ore is free milling.

The principal mine of Yellow Pine, the only one being worked at present, is the Keystone, six miles east of Good Springs. Ten men are employed. A shaft has been sunk 110 feet, and a tunnel run 150 feet. In the face of the tunnel the ledge is 2½ feet wide, the ore from which assays from \$23 to \$30 in gold. The owners of the Keystone recently shipped 75 tons of ore to Pueblo, Col., for reduction, which netted them \$35, all gold, the assays ranging from \$446 to \$3195 per ton.

Another mine of merit is the Clementina, owned by Mr. Keeley. Six assays of ore, red oxide of iron, averaged \$323.42 in gold—the small percentage of silver not being counted. The mineral is flour gold, and easily horned, the ore being so crumbly that it can be pulverized between the finger and thumb. The great trouble in working the ore might be in saving the fine gold, which runs off, but the oxide of iron forming a natural flux a high percentage of the mineral can be saved. Omaha parties have offered to mill the ore on as liberal terms as offered in San Francisco.

The Boss mine, four miles west of the Keystone, one of the best developed in the district, has been bonded by S. T. Godbie Jr. of Pioche and Mr. Keeley. A shaft has been sunk 45 feet, one tunnel run 110 feet and three others from 10 to 60 feet, showing red oxide of iron and copper. The ledges blend 5 feet copper and 5 feet gold. The copper averages 14 per cent, silver 6 ounces, gold 1¼. They have in sight and on the dumps 1500 tons. A mill test of two tons of the gold and copper ore worked up to 80 per cent. The ledge can be traced from 1200 to 1300 feet on the surface.

The drawback to development of Yellow Pine district is the lack of railroad facilities. A Denver corporation is now engaged in running the Nevada Southern railroad from Blake (formerly Goff's) on the Atlantic Pacific to Vanderbilt, in San Bernardino county, thirty-five miles. A branch road seven miles in length will be run south from the main line to New York district, twenty-eight miles from Blake. When the road is completed to Vanderbilt it will run to Good Springs, forty-five miles, the center of Yellow Pine, and may connect with the Denver and Rio Grande at Salina, Utah. But the main point is to run to Iron City, Utah, to tap the magnetic iron mountain there, the largest iron deposit in the United States, and also to reach the coal fields at Kanarra, Utah. Twenty-six miles of the road from the road from Blake has already been built—within nine miles of Vanderbilt.

The company building the Nevada Southern from Blake is interested exclusively in a series of mines in New York district, where it has eighty men employed. The ore is low grade silver and when the branch road is finished to that locality the ore will be shipped to the company's reduction works at Needles, where it can be worked at a profit.

The gangue of the ore found in Vanderbilt district is granite and gneiss. The ore is sulphuret, the veins being continuous from the surface down. The ore from the mines owned by the Bonanza firm averages \$45 per ton in gold.

When the railroad shall have penetrated Yellow Pine district mills for the reduction of the ore will be built on the San Bernardino desert, which is only 1800 feet above the sea level. In a descent of ten miles from Yellow Pine there is a drop of 3100 feet. Wells will be sunk on the desert, where water is obtainable from three to twelve feet below the surface.

Mr. Keeley is confident of the future prosperity of Yellow Pine. He says there are base ores enough in the district to run a large number of smelters for ten years. The climate is not enticing. The temperature ranges from 90 degrees in January to 110 in summer. Vegetation is scarce—nothing grows there but cactus and tule-palm (commonly called "Joshua"), which is used for fuel, and rattlers are thicker than gophers in Mason Valley. But whoever heard of anything deterring the hardy prospector in search of gold.

GLUCINUM.—Dr. John Gibson in a paper read before the Chemical Society, states that of the many methods proposed for the preparation of glucina from beryl, only a few give satisfactory results, and none of them can be applied easily on a large scale. The percentage of glucinum in beryl is small, and it is therefore necessary to work up large quantities of this very hard mineral in

order to obtain a stock of glucina sufficient for the purposes of investigation. Hitherto it has been found necessary to grind the mineral to a very fine powder as a preliminary to its complete decomposition by the usual agents employed in the case of refractory silicates. The present communication gives an account of a method by which a kilogramme or more of beryl may be worked up at a time in an easy manner, and without being ground to a fine powder, the whole of the glucina contained in the beryl being obtained very quickly in a nearly pure condition, and, in particular, nearly free from alumina and oxide of iron. The method is based on the different behaviour of the fluorides of aluminium, iron, and glucinum when heated together, it being found that if coarsely ground beryl be heated in an iron vessel with six parts of ammonium hydrogen fluoride, the mineral is completely decomposed at a temperature below a red heat, the soluble aluminium fluoride at first formed being rendered insoluble in water if the heating be sufficiently prolonged, while the bulk of the fluorides of iron are decomposed and converted into ferric oxide, the glucinum fluoride remaining soluble in water. A new method for the perfect removal of the last traces of iron from the crude glucina is also described, based on the observation that in the presence in solution of a large excess of a lead or mercuric salt the precipitation of the lead or mercury as sulphide by ammonium sulphide effects by mass action the complete precipitation of the iron.

The Profits of Street Railroads.

Because the Market-street system and the Sutter-street cable lines pay handsomely, some of the San Francisco daily papers think that all street-car lines are most profitable concerns. The fact, however, is the reverse. The Ferries and Cliff (Jackson and Powell-street) lines have never paid a cent of dividends. This system could have done so before this, but that its lines run through districts of the city, westward, where street improvements of the most expensive nature have for three years been continuous. Bituminous rock pavement has been laid for miles along the streets through which that road's lines run. It is, like all other roads, required to do all street work between and for two feet on each side of its tracks. It has spent \$150,000 for street work within three years. Owners on the line of this road have thus had their street assessments that much lightened, besides the addition of cheap and rapid travel. Meantime, the stockholders have not made a cent of profit, while lots out by and beyond Central avenue have gone up 300 to 500 per cent, chiefly through the rapid and cheap communication the road afforded. For these advantages owners not only did not pay a cent of subsidy, but in some cases even made the company grade the whole of the unopened streets at its own expense. One very large owner, too, asked \$30,000 for a lot he thought the company must have, but it secured the lot just opposite, of nearly the same size, for \$1000. The Union-street line is paying no dividends, but has just expended \$180,000 in extensions. The Geary-street line is paying a dividend occasionally only. The Omnibus is paying nothing, and the electric road has, of course, paid no profit. Yet no city in the world has, since the transfer system was inaugurated between the cable lines, such cheap and perfect transportation as San Francisco. Vacant lot owners, speculating in values which they never created, and intent only on doubling up prices on buyers, keep urging further road extensions and still cheaper riding from street-car companies, who, without pay or subsidy has given to their land the value it now has. These owners purposely ignore the fact that capital does not build roads for amusement, but for profit, and that until they have earned at least a small profit they can neither reduce fares or make further extensions.

Calaveras County Marble.

Calaveras county comes to the front again with an industry that will in time outdo anything in the State. This time it is a solid mountain of marble. We have examined polished specimens taken from the Caldwell Consolidated Marble mine, which is owned by Messrs. Caldwell, Borger, French and Longley of Valley Spring, and is located about six miles from Valley Spring, midway between San Andreas and Valley Spring, and within one mile of the line of survey of our narrow-gauge railroad. The location of the mine is elevated above the railroad sufficient to transport marble by tram-way to the railroad. At present, products of the mine can be delivered on board of the cars for \$200 per ton.

We have on exhibition in our office, polished samples of this marble, and invite inspection of same. Many varieties can be found, but what predominates is the dark or mottled variety, suitable for building purposes. Slabs of any size or length can be procured without a fracture, and entirely free and clear of any mineral deposit.

In our opinion our county fathers should investigate this quarry with a view of putting in trimmings at least, if not a front, of this material in our new Hall of Records. Arrangements can be made with the owners of the quarry that would be satisfactory. We believe in fostering such enterprises, when they will bear investigation, and where there is a show to develop an industry that would be highly beneficial to the entire county.

E. J. Caldwell has been earnestly engaged in opening this property for the past year, and to his energy is due the ultimate success we expect to see made by the present company. Large blocks have been sent to the marble firm of Dixon & Woodhull of Stockton, and to the San Jose Marble Co., and after working them, the marble was pronounced to be of a superior quality, which is sufficient guarantee that all that is now required is to figure on transportation to make the industry a success. They have both quantity and quality in abundance.

The New Ferry House.

The great ferries, which for nearly twenty years have received and landed their passengers at or near the foot of Market street, are the chief connecting links between the metropolis and the outer world. It is true that many gain access to San Francisco by the Golden Gate and by rail along the peninsula, of which the metropolis occupies the northern end, but very few do not use the ferries at some point of their journeying. The ferry conveniences are, then, of interest and importance to the whole population of the Pacific Coast, and not the peculiar property of the thousands of commuters who seek their suburban homes through its well-guarded gateways.

The old aggregation of sheds with barn-like architecture, with interior walls bespangled with baking powder advertisements, with ceilings festooned with cobwebs and floors soaked with bilge water has for years been not only a municipal disgrace but an affair unworthy of the State. This has not particularly impressed the commuter. He always enters and leaves the ferry house with horizontal coat-tails, and if his course led him through even a more desolate structure he would not notice the good intentions on the floor nor tarry long enough to note the rise of temperature. The commuter is a straight line, the shortest distance between two points and the media permeated do not count. But to the intransigent from the interior of the coast or from the distant world the ferry inconveniences of San Francisco have always been a surprise, a disappointment—an insult.

Probably while San Francisco had a system of wharves which could be fairly counted a disgrace to a salmon can-

Building a Water-tight Masonry Dam.

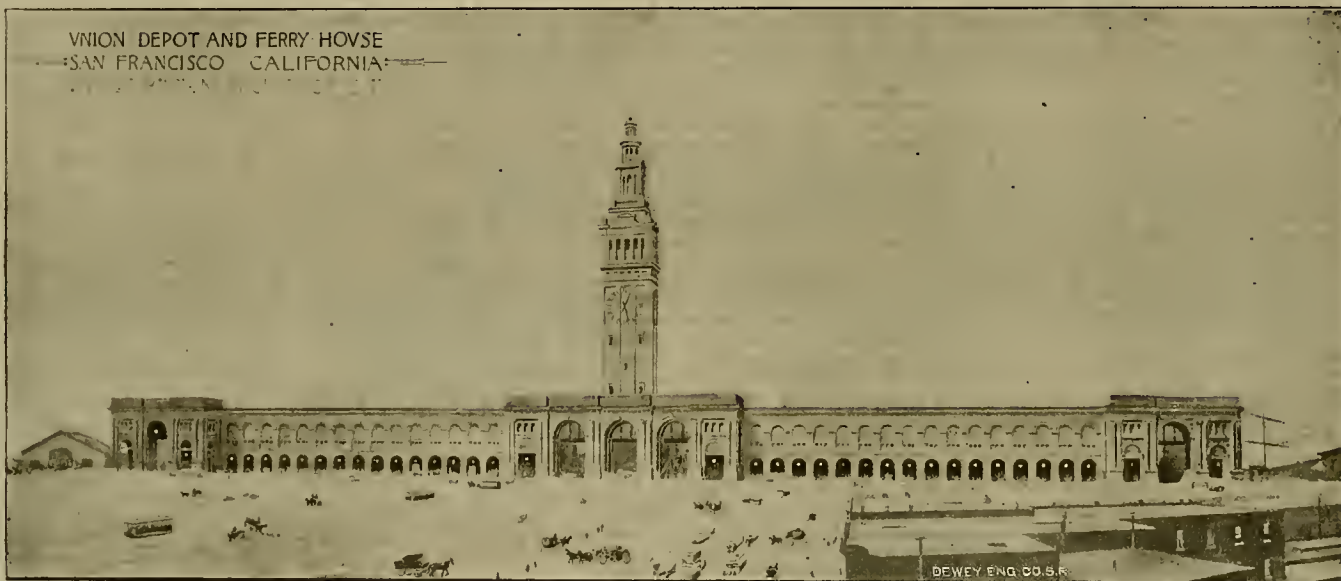
Mr. Walter McCulloch read a paper at the last meeting of the American Society of Civil Engineers on "The Construction of a Water-tight Masonry Dam," and an abstract is published in the *Engineering News*. The dam described was the Sodom dam on the Croton aqueduct system, at what is known as "Double Reservoir I," or more familiarly as Sodom and Bog Brook reservoir. This reservoir consists of two basins joined by a ten-foot circular tunnel 2000 feet long, through which the water passes from the basin, which has the larger water-shed, into the Bog Brook basin, which has only $3\frac{1}{2}$ square miles of water-shed, with a storage capacity nearly as great as the former which drains 73.42 square miles. The combined storage capacity obtained in this manner is 9,500,000,000 gallons. Sodom dam, which impounds the water in the larger basin, is of masonry throughout, and the Bog Brook dam is of earth only. The Sodom dam spans a gorge and is 500 feet long at the opening line, which is 78 feet above the river-bed.

Examinations at the site were made by test pits and borings in 1886. The dam crosses the valley at right angles to the stream which here flows to the north, and at the site adopted the hill to the east showed an outcrop of hard gneiss rising abruptly 30 feet above water, with boulders and gravel at its foot. The rock back from this rose about 40 feet in 100, and was covered with a few feet of soil. The slopes on the west side were 15 per cent at water surface, diminishing to 5 per cent at top of dam, and the rock, which was from 4 to 10 feet below the surface, was decomposed and shaly for a depth of about 15

mortar. On top of this a bed of stiff wet mortar was laid and capped by a large rubble stone. After the first six feet of rubble foundation had been placed there was no further trouble.

The dam for about 40 feet of its height is of rubble masonry laid in Portland cement mortar mixed 2 to 1. Above this there was facing stone, 30 inches deep, laid in 2 to 1 Portland cement mortar, backed with rubble in mostly 2 to 1 mortar. The rubble stones varied from a cubic foot to a cubic yard in bulk, and were laid in full beds of mortar. There were no through horizontal joints. Joints were filled with mortar, into which as many stone spalls were forced as was possible. All stone was marked before using. Sand and cement were mixed dry, and then wet only when required. All cement passed through a sieve of 10,000 meshes, and was carefully tested. All loamy sand was rejected. The face stone was a light bluish gray limestone, cut rectangular, with rock face. Stretchers were 3 to 6 feet long by 30 inches wide, and headers 4 feet long. The thickness of courses diminished from the bottom up. The beds were at right angles to the face, and the stone had to be held in place with wooden blocks and wedges, to prevent slipping until the mortar had set, after which the blocking was removed and spaces left were filled with rubble. The dimension stone was brought by rail from Wilmington, Del.

Stone setting was done by the use of the cable, the traveler and derricks. The cable consisted of a $2\frac{1}{2}$ -inch steel-wire cable, stretched over and parallel to the dam, and over towers 667 feet apart, and anchored in the bedrock. On this a trolley ran, which was worked by a double-drum reversible engine. A load of 10 tons would sag the cable 25 feet with a clearance of 5 feet above the coping. Most of the excavation was removed, and all material delivered on the wall in this manner. The cost of the cable erected



THE PROPOSED UNION DEPOT AND FERRY-HOUSE, SAN FRANCISCO.

nery it was impractical to do anything decent in ferry landings. As, however, the water front belongs to the State, the city is not chargeable with the long-endured outrage to the traveling and commercial classes. For years the work of sea-wall and pier building has been pursued and the ferry improvement has been finally reached. In this place we merely mean to call attention to the very creditable structure which is now projected on the general lines shown in the engraving on this page. It is designed to be a union ferry house and thus will accommodate the several ferries plying to different points on the bay shores. The outside dimensions will be 850x150 feet, and the general cornice-line will be 50 feet above the base. Three entrances will extend the entire length of the building, and a like number of grand staircases will lead to both of the upper floors. These entrances will have three large arches extending through both stories, and from the central arch in each entrance there will be a staircase to the second floor. The entrances will project 35 feet from the seawall, and thus break the long line of the building. The arches will be one on either side of the main entrance and the third in the center. On each side of the arches will be great Corinthian columns 21 feet in circumference. The whole front of the ground-floor will be crossed by a continuous arcade, a covered passage-way leading directly to the ticket offices, baggage-rooms, etc.

Surmounting the center of the facade will be a tower of 250 feet. To support this a separate foundation is needed. The tower will not only be the first object to meet the eye of the passenger on the ferry-boat, but will serve as a clock-tower and beacon, visible for many miles. The tower will be made of iron and steel, and will not only be fire-proof, but earthquake-proof as well.

The first floor will be divided into various waiting-rooms, baggage-rooms, postoffice, and express-office. The second floor will in a measure be a duplicate of the first, and will be so constructed to accommodate passengers to or from the upper decks of the ferry-boats. On this floor the refreshment-rooms will be located, and also the offices of the Harbor Commissioners. The principal feature of the second floor is a corridor 50 feet in width, and extending the whole length of the building. The exterior face of the building will be of Roman brick and terra-cotta, with a base of granite. The interior face will be of glazed and enamel bricks.

feet. The rock in the river-bed was solid and was overlaid by a light deposit of sand and gravel. The ridge to the east, below the site of the dam, was parallel to the river and about 75 feet above it, and a dam of earth 600 feet long was constructed upon it to the height of the masonry dam, and at the north end of this earth dam is the spillway dam, which is a masonry wall 8 feet high and 500 feet long, with the lip 10 feet below the top of coping of the Sodom dam and 6 feet below the flood line. After passing this the waste-water follows through an old water-course in a channel cut to the rock and between curved retaining walls.

The greatest height of the dam (above rock) is 98 feet, the thickness at bottom is 53 feet, and under the coping 12 feet. The total batter on the lower face is 37 feet, decreasing from 9 3/4 in 10 to 2 7/8 in 10. The batter on the back is 10 per cent up to 38 feet below the top and plumb above that point. The gate-house is 37x42 feet and rises 23 feet above the dam near the center. The discharge is through two 48-inch pipes, which pass through the body of the dam. The work was begun February 22, 1888, and completed and accepted Oct. 31, 1892, nearly three years after the date fixed by the contract. The floods in the stream rise suddenly and the discharge in a spring freshet reaches 250,000 cubic feet per minute. To control this during construction, a timber crib dam was thrown across the river about 80 feet above the site of the work and a canal cut 26 feet wide and 15 feet deep on the west side and around the work to a point 500 feet below. The gatehouse and eastern half of the dam were then built to about 25 feet above the discharge pipes, and in the dry season of 1889 the water was turned through the pipes and the other half of the dam started.

In preparing the foundation all loose rock was removed by dynamite, and afterward all loose seams or shakes by blasting with black powder and harring out. The foundation was swept with wire stable brooms and washed clean. All pockets or holes were then filled with rich Portland cement concrete. A tighter bond, it was found, could be made with rubble consisting of small stones than with concrete beds. Water entered through several seams in the rock and would wash the mortar out of the concrete, but it could be led around the rubble beds until finally a small well 2 feet in diameter and 1 foot deep was formed at the point where the water boiled up. After the mortar had set the well was bailed out and filled quickly with dry

was \$3750. The first cable, after 15 months' use, parted without warning under a load of 6 tons, the break in the author's opinion, being probably due to unequal wear at the point where stone and cement were hoisted. The towers were then raised 10 feet, as to lessen the tension, and a new cable supplied, which lasted until the completion of the work. When the wall had reached a point 31 feet below the top, the standing derricks were replaced by a traveling derrick, mounted on a 30-foot trestle and running on a track of 36-feet gauge; a boom 55 feet long was used with this derrick.

The most serious flood occurred in November, 1889, when 3.8 inches of rain fell in 18 hours, and 8.7 inches during the month. In eight hours after the rain had ceased, the water rose to 10 feet behind the dam, and in 12 hours to 15 feet, and poured over the top of the dam, although both 48-inch pipes were discharging to their full capacity. No serious damage followed, as part of the dam over the channel was kept 4 to 5 feet lower than the balance of the wall.

The final estimate for dam and appurtenances was \$436,499. The lowest bid received at the letting was \$366,990; the highest, \$583,315, and the engineers', \$540,030. The difference between the bid and estimate was due to modifications in the plans.

The dam is water-tight. With 68 feet of water behind it, no leaks whatever have been found, either through or under the wall, or around the ends. Sweating at the joints appears at points, but not so much as to cause a trickle; and it cannot be seen on a dry day. This very desirable result is due to the excellent materials used, the care in preparing the foundation, thorough cleaning of all stone, care in mixing mortar, breaking of joints horizontally and vertically and close attention by the engineers to every detail. In addition to this, the desire on the part of the contractors to do good work and the existence of a proper relationship between them and the engineers were factors. The contractors were Sullivan, Rider & Dougherty.

THE purchase by Goodall, Perkins & Co. of the controlling interest in the Oregon Coal and Navigation Company's steamers and coal mine is looked upon by business men with great favor. The coal mine at Marshfield was about to be shut down, but under the new management the mine will be opened on a larger scale and give employment to several hundred men. It has always seemed

strange that Goodall, Perkins & Co. did not own their own coal mines, since they are such large consumers on their steamship lines. Goodall, Perkins & Co. will in the future operate the line of steamers to Coos bay, and the passenger and freight traffic between here and southeastern Oregon will be benefited. The purchase carries with it all of the company's property, including the mines and mining lands on Coos bay, the three-mile road to the bunkers at Marshfield, the immense bunkers where steamers go alongside to load, the wharf and warehouses at Marshfield, the hoisting gear and tramway in this city from Vallejo-street dock across East street to the main bunkers on the State lot and the ground lease, and the steamers Arago and Arcata. The Arago is an iron steamer of 620.6 tons net. She was built at the Union Iron Works in 1885 expressly for the coal trade between here and Coos bay. Her coal-carrying capacity is about 1200 tons. The Arcata is a much smaller steamer, registering only 415.56 tons net. The coal mines and mining lands are about three miles from the town of Marshfield, on Coos bay, and are reached by a small railroad about three miles in length. At one time these mines were quite productive, but of late, it is understood, the developed parts have been pretty well worked out, so that the new owners will be given a chance to branch out and open new ledges adjoining. The coal mines in southeastern Oregon are practically inexhaustible and several new claims near the shores of Coos bay are being opened, while there are plenty of others that are awaiting capital for future operations.

The Asphalt of Trinidad.

We take the following from a report prepared by U. S. Consul W. P. Pierce, at the request of the U. S. Government:

It is quite a difficult matter to say what the market price of asphalt is at Trinidad, because it is subject to so many anomalous conditions. The original cost to the government or to the owners of the lands prior to the asphalt rage was substantially nothing, and the cost to those who have since purchased lands varies.

In respect to present dealers, very little if any pitch is sold in isolated quantities. The usual contract is for the owner or lessee of the land to deliver so much pitch at a certain price annually for a term of years. I should judge that those dealers who have contracted for La Brea land pitch within the last six months have had to pay somewhat more than the lake pitch is sold for to shippers to Europe, to wit, 28s. 6d. or \$6 84 in local money, free on board.

The following itemized estimate per ton in respect to land asphalt is believed to be a fair approximation:

Price of pitch in the ground.....	\$4 00
Digging, overlooking and cleaning.....	50
Carting.....	40
Loading lighters and loading ship.....	30
Lighterage from shore to ship.....	50
Contractor's profits, mercantile commission and all other expenses and losses.....	1 10
Export duty.....	1 20
Freight and insurance to New York.....	2 25
Total.....	\$10 25

When large quantities of asphalt are being handled or other favorable conditions intervene, this total could, of course, be reduced. It is a matter of public record, for instance, that the first cost of the asphalt taken from the pitch lake by the Trinidad Asphalt Company is only 40 cents per ton, and it can be dug more readily than the land asphalt.

I have heard it claimed that all the land asphalt at La Brea is substantially one deposit, and that applying the designation of "lake" to only a portion of it is incorrect; but the only part that can be said to be like a lake is alone called a lake by the community.

The village is on an extreme point called La Brea Point; another extreme to the east is called Point d'Or. The lake is further inland, being southwest of these points and about a mile from them, and about two-thirds of the way from Point d'Or to the opposite side of the peninsula. The lake has an elevation of 138½ feet, according to Wall and Sawkins, above high water, and on three sides the land slopes from it. It is circular in form, and covers, according to a government survey in 1886, 109 acres 9 perches, and it is believed to contain several million tons of asphalt. The geological report of Wall and Sawkins puts the maximum amount which can be expected to exist at 4,752,000 tons. Since this estimate several hundred thousand tons have been removed. The report mentions that the term "inexhaustible," applied to the lake, "has probably arisen from the circumstance of artificial cavities rapidly closing up, which may have led to the supposition of the substance being reproduced or generated as fast as removed; but it is essential to remember that every pound abstracted diminishes the remaining quantity by that amount." I believe from the information I have obtained that the contents of the lake have decreased in volume during the last decade, indicating that the supply, if it has one, is not equal to the drainage that is now being made from it.

Persons who have seen a large round pond, substantially dried up, with little strips of clear water irregularly intersecting its bed, here and there patches of vegetation, and a slushy looking place near the center with fish bubbles coming up, the entire bed blackish and uninviting, can form a very fair idea of the general appearance of this famous lake. An odor described to be like that of sulphureted hydrogen gas is emitted at the sloppy looking place called the "place of supply," where many gaseous bubbles appear. In passing over the lake one will see more or less of these little bubbles, and if he stoops down and catches the odor from them he will find it the same as the odor at the "place of supply" near the center. There are also over the lake more or less little swellings of different shapes and sizes, and I am told the smaller of them (say an inch square) con-

tain only gas, and that some of the larger ones (say a foot square) contain both gas and decayed vegetation.

There are large numbers (say two or three dozen) land islands over the lake which would probably aggregate about three or four acres. They are covered with vegetation, and some of the support trees 20 or 30 feet high; but I am told these islands do not come up from the bottom of the lake, nor do they bear down any considerable distance into the lake. Mr. J. W. McCarthy, the local manager of the Trinidad Asphalt Company, informed me that he destroyed one of them, and the pitch under it arose to its own level, or the general level of the lake. A horse may be ridden on the lake and up to the "place of supply," and, under particularly favorable conditions, I am inclined to think he might be ridden through it.

It is difficult to give a very satisfactory description of this particular spot, and no two descriptions of it can be exactly alike, for it is never identically the same on any two occasions. In an open space, say fifty acres or more, in which there is no vegetation whatever, may be seen a zig-zag, irregularly outlined spot, which undergoes constant change in shape and size (when I was there last and took a good look at it, it was bow-shaped and approximated an acre in size). It differs from the surrounding pitch in outward appearance, as freshly molded or bright lead would differ from led of a duller and darker hue. All of this fresher looking pitch is softer than the pitch surrounding it; but on some of it, at the more distant edges, one may walk without sinking below the heel of his shoe, and I apprehend from appearances, and was so told, that it is only a matter of time for the outer parts to become indistinguishable from the body of surrounding pitch. Within this particular area is located what is called the "place of supply," which is one or more spots where the pitch is always softer and where, in the hotter part of the days, the pitch, or rather the water surrounding the pitch, fairly boils. These soft parts constantly shift their position, and their fomentations undergo great change, seemingly regulated by the heat of the sun. I am assured by witnesses, whose word I cannot call in question, that they have seen the "place of supply" when a person could not have walked into it, both on account of the intense heat and the probability of being engulfed. I have never seen it present so terrible an aspect. On one afternoon, when it was probably in its usual state, in the hottest part of the day, I saw a man walk into it with impunity, and it only came up to the calves of his legs. He picked up a handful of the pitch and handed to me. It was as pliable as soft putty, and I manipulated it without any of it sticking to my hands; but the water which oozed from it somewhat discolored my hands, and I was told that if I had continued the manipulation longer, till all the water oozed out the pitch would have become sticky. Early one morning (eight or nine o'clock) I visited the "place of supply," and the man I had with me walked all over the softest spot without sinking deeper than his foot. At that time two carts containing barrels were being loaded with the "liquid pitch," and the process was to dig and pull it up with picks in lumps, which were put by hand into the barrels. I was told that in the hot part of the day the pick was dispensed with and the shovel used instead.

One of the cartmen pointed to a particular place, a foot or two square, where he said he had been digging that morning and which had filled up. The man with me stepped into this place and gradually sank nearly to his knees, but sank no farther. I also noticed that this pitch, unlike that on the previous occasion referred to, stuck with considerable tenacity to the man's legs.

The little channels of water referred to constitute quite a relief to the view. These are quite clear and pretty. They vary in width; but, unless unduly swollen by rainy weather, they may be roughly estimated at two to six feet wide and, say, one foot to two feet deep, though in places the water is much wider and deeper. By these deposits of rain-water the lake is divided into a great many irregular divisions. Several persons told me that it was their understanding that these little channels rose and fell with the tide, which seems unreasonable; but, as the opinion is entertained by some of the residents of the neighborhood, I submit it. The pitch comes holdly up to the water, but rarely, if ever, slopes gradually into it, but at the water's edge it is inclined to curve down abruptly, and under the water it does not promptly adhere to the pitch on the adjoining area.

It is understood that the pitch is in constant motion, and the theory has been advanced that each of these irregular divisions has a motion of its own. It would seem, from the appearances, that the water at the outer part of the pitch of the adjoining division has a very repelling effect on the advancing pitch, or else these several divisions of pitch do turn under and revolve respectively within themselves. But evidently the pitch yields in a marked degree to the influence of water. I noticed a little spot of water about six feet wide, which was probably three feet deep—a depression which, if not originally caused by the settlement of water on the spot is kept in existence by the water. In other words, the pitch would doubtless find its own level were it not for the water. I am strongly inclined to think that the "place of supply" described above, if not the source of supply or generation, is a source of general motion, the degree of motion lessening as it recedes from this center. The fact that there is a large area next around the "place of supply" on which no vegetation grows, and that, (in addition to the well-defined land island,) more or less vegetation is found as you approach the border, seems to indicate that the motion near the "place of supply" is too great for sufficient earth to accumulate on the surface to support vegetation.

A MOVEMENT is on foot at Fort Bragg, backed by Michigan capital, controlled by General Alger, Senator Stockbridge and O. R. Johnson and Messrs. White and Plummer of the Union Lumber Company, to build a railroad northeast sixty miles, to John W. Mackay's mountain of coal on the east side of Round Valley, all in the northern portion of Mendocino county. The Union Lumber Company, in which all these men are largely interested,

is a recent combination of the Fort Bragg and Noyo lumber companies and is the owner of many miles of railroads. The company has already built into the redwoods a standard-gauge road, seven miles north to Glen Blair and another nine miles east to McKay's Camp. This last is the road to be extended straight on through Sherwood Valley to the Indian Reservation coal mine. This cross-road would be promptly met in Round Valley by a north extension of the San Francisco and North Pacific and by a south extension of the Eel River and Eureka road from Humboldt Bay.

A Giant Redwood for the World's Fair.

The Eureka Times Rio Dell correspondent sends the following interesting account of the big tree from near Englewood that has recently been prepared for shipment to the World's Fair: "Mr. J. H. French has just completed the work of getting out a section of a mammoth redwood near Eel river and about two miles from Englewood. The log from which the outside was taken was twelve feet long and twenty feet in diameter at the butt, and bark and all scaled 36,000 feet board measure and was estimated to weigh when solid 129 tons; this, however, is not to be shipped whole. The outside or shell, about eight inches in thickness, is off, leaving the heart on the ground. It has been rafted down to the head of the Pacific Lumber Co's track and will go via Field's Landing to San Francisco, thence to Chicago, and when it reaches Jackson Park it will be put together and have a door so that visitors from all parts of the world can be admitted and see a Humboldt redwood outside and inside. Mr. French also got out a log two feet in length and fifteen feet in diameter and scales 3600 feet board measure, bark and all, and will be sent forward with the other pieces. This will be shipped in solid log and be a part of the Humboldt county exhibit. The shell is the property of Mendocino county parties, and has cost up to date \$750. The tree from which these pieces were taken was broken off 220 feet from the ground and was nine feet in diameter at the break, and Mr. French thinks the tree when standing at full height was 417 feet high. Mr. French is probably one of the best practical timber workers on the coast."

A Good Whitewash.

The following was "picked up" somewhere years ago, and parties to whom it has been given say that the wash is in every way satisfactory:

"Take one-half bushel of unslaked lime, slake it with boiling water, cover it during the process to keep in the steam; strain the liquid through a fine sieve or strainer, and add to it a peck of salt, previously dissolved in warm water, three pounds of ground rice boiled to a thin paste and stirred in while hot, one-half pound of powdered Spanish whiting and one pound of clean glue, which has been previously dissolved by soaking in cold water and then hanging over a slow fire in a small pot hung within a larger one filled with water. Add five gallons of hot water to the mixture, stir it well and let it stand a few days, covered from the dirt. It should be applied right hot, for which purpose it can be kept in a kettle or a portable furnace. It is said that a pint of this mixture will cover one square yard, if properly applied, and answers equally as well as oil-paint for wood, brick or stone, and is much cheaper. Coloring matter may be added as desired. For cream color, add yellow ochre; pearl or lead, add lamp or ivory black; fawn, add proportionately four pounds of umber to one pound Indian red and one pound common lamp-black; common stone color, add proportionately four pounds raw umber to two pounds lamp-black. The east end of the President's house at Washington is embellished by this brilliant whitewash; used by the Government to whitewash lighthouses, etc.

THE company which recently purchased the North Pacific Coast Railroad intends developing some enterprises which will benefit Mario and San Francisco counties. One of these is the construction of a road starting from a point on Richardson's bay above Sausalito and running to Bolinas bay. At this latter point it is proposed to develop a second Coney Island. In the early part of this month the syndicate which Mr. Harvey represents purchased 10,000 acres of the Sausalito ranch for \$500,000 from the Tamalpais Land and Water Company. The ranch formerly belonged to the Throckmorton estate, and extends from the hills back of Sausalito along the bay and ocean nearly to Bolinas. It includes a part of Bolinas beach and its northern boundary takes in the southern slope of Mount Tamalpais. This beach has all the requisites of a watering-place, and here it is proposed to erect a magnificent hotel. The conditions for bathing are unsurpassed, and there are five miles of beach as hard and smooth as a floor. The climate is unexcelled by either Monterey or Santa Cruz. By the most favorite route the proposed new line will be but twenty-one miles long, and as it will skirt the ocean for a part of this distance, it will afford a magnificent ride. Persons leaving San Francisco will be able to reach the resort at Bolinas beach in less than an hour and a half. The new road will open up a rich farming district, and the agriculturists are already jubilant over the prospect of an opportunity to get their products to market. It is estimated that the new road, hotel at Bolinas and ferry-boat will cost at least \$1,000,000.

THE South Yuba Water Company is considering the proposition of furnishing Sacramento with electric power and later with pure water. Both plans have been declared practically feasible. A survey has already been made from Roseville to Sacramento. Dr. Van Norden said that 1000 horse-power could be brought to Sacramento in sixty days' time. Such a scheme will not only prove a boon to Sacramento but to Placer county as well. It would give employment to many and all the towns below Auburn could maintain an electric light plant.

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ABSTRACT OF CONTENTS.—I, Horse Railways; II, Steam Motors; III, Ammonia Motor; IV, The Hot-Water Motor; V, Gas Motors; VI, The Pneumatic or Compressed-Air Motor; VII, Tests of the Hardie Compressed-Air Motor; VIII, Economical Modes of Compression; IX, Cost of Operation of the Compressed Air Motor for One Day; X, Other Air Motors; XI, Cable and Electric Roads; XII, Electric Lines; XIII, Low-Pressure Air Motors; XIV, Storage Batteries; XV, Cost of Carbonic Acid as a Motive Power; XVI, Transmission of Power by Means of Pipes; XVII, General Summary; Appendix; Index.

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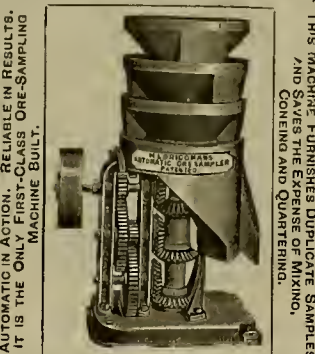
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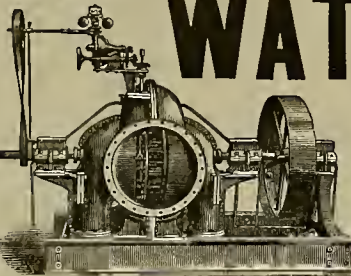
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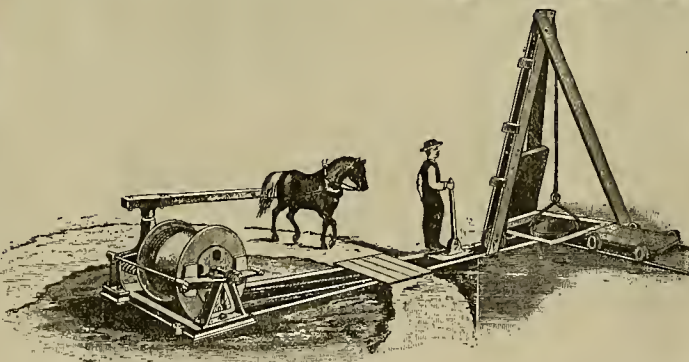
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Mechanical Progress.

Lamination in Metal.

Prof. John Tyndall contributes something new upon the subject of cleavage, as it occurs in crystals, rocks, ice and other bodies; and his studies lead inevitably to the conclusion that lamination results from the operation of the same laws under analogous conditions as those which produce the property known in mineralogy and crystallography as cleavage.

At first, one would suppose wax, or baker's dough, to be most unlikely substances wherein to detect any tendency to cleavage; yet it is precisely with these materials, wherein plasticity is a most prominent physical property, that Prof. Tyndall has performed experiments that are commanding the attention of the scientific world, and the results of which have an important bearing upon the metallic processes. In these plastic materials and others, such as clay and graphite, Prof. Tyndall has proved that cleavage may be developed in as marked a degree as in slate—even the varieties of the latter used for roofing—by the simple application of pressure to the plastic mass. Cakes of wax that have been thus treated are easily split up into regular laminæ, so uniform in character as to excite the surprise and admiration of those who have witnessed the experiments.

These researches appear to have proved that any material, no matter how plastic or how homogeneous it may appear to be, has within it the condition for the development of cleavage, and that the only external condition necessary to produce lamination is a sufficient degree of pressure exerted in one direction upon the mass. The resulting planes of cleavage will be at right angles with the direction in which the pressure is applied. The philosophy of this effect lies in the fact that, as relates to the cohesion of its particles, no substance is strictly homogeneous; that is to say, the particles, granules or molecules of substances do not possess cohesive power equally in all directions; and hence, when pressure is applied to them, they slide over each other (the sliding surfaces being those of least cohesive power), and move toward a point of less pressure. In the case wherein pressure is applied in one direction only, the sliding will be in a direction at right angles with the direction of the pressure, and thus plates, laminæ or strata are generated in the mass, the limiting faces of these layers having less cohesion than their interior parts.

It is thus that under the action of the rolling-pie flaky pie-crust is formed. The same kind of stratification is formed in a biscuit, while in bread, the loaves of which are shaped by kneading, this stratification is absent, and a fibrous structure—called by bakers the "pile"—results from the difference in the manipulation. It is entirely indifferent what kind of material is thus operated upon, provided that it will in some degree yield to pressure without crushing into powder; the result of pressure exerted in one direction more than in any other will result in lamination more or less marked. A practical illustration of this kind of action is found in iron and other metals. When iron undergoes the ordinary process of rolling, it is taken at a welding heat from the furnace, and the uniformly distributed heat weakens the cohesive power of the particles quite equally throughout the mass; the result is a fairly homogeneous bar or plate. However, in bars the tendency to longitudinal stratification is manifest, and when the bars are cold and cohesion has again been restored to its normal power, it can always be found that iron so produced is stronger longitudinally than laterally.

The Ferris Wheel.

One of the interesting "side shows" on the Midway Plaisance will be the great steel wheel designed by Mr. G. W. G. Ferris, of G. W. G. Ferris & Co., engineers, of Pittsburg, Pa., which is to carry passengers in cars swung from the periphery. The wheel will be 250 ft. diameter, built up of structural iron, and the top will be 264 feet above the ground. There will be practically two wheels, 28 ft. 6 ins. apart, and connected by bracing. The steel axle is of enormous size, 33 ins. in diameter, 45 ft. 2 ins. long, and weighs 89,320 lbs. Its cost was \$35,000. It was forged by the Bethlehem Iron Works and shipped to Chicago on March 18th. The axle is supported in bearings on steel towers 137 ft. high, and having four main columns, the two inner ones vertical, and the two outer ones inclined, with arched portal entrances and the usual bracing. Ample provision has been made for wind pressure on the wheel and towers. The towers are

50x40 ft. at the base, and 5 ft. square at the top, and having masonry piers on pile and concrete foundations, with a load of not over 2,000 lbs. per sq. ft. of base.

Between the two rims of the wheel will be 36 passenger cars, swinging on trunnion bearings so as to remain in their normal position during the revolution of the wheel. The cars will weigh about 19 tons, and each accommodate 60 persons, or 2,160 passengers in all. The landing platforms are arranged so that six cars can be unloaded and loaded at one time. Passengers will be given two complete revolutions, occupying about 20 minutes, the distance traveled being nearly a third of a mile.

The total weight of the structure is 4,300 tons, about 60 per cent of which will be in motion. According to the published particulars the engines to turn this wheel will be 2,000 H. P., and will consist of two reversible engines, with cylinders 30 ins. diameter and 4-ft stroke, with link motion. These will drive a train of gearing with wheels 12, 14 and 16-ft. diameter, with a steel chain passing over a cast steel pinion on the main axle. Only one engine will be used at a time, the other being for use in case of a breakdown. The machinery will be in a chamber below the surface of the ground, where the electric lighting plant will also be installed, as it is proposed to light the cars and the wheel by about 3,000 incandescent lights. F. J. McCain & Bro., of Chicago, have the contract for erection. The total cost of this wheel and its accessories will be about \$300,000.—Engineering News.

STEEL BARRELS.—A new industry is springing into life at Barrow, England. For some time, experiments have been conducted at Wakefield, in the production of steel barrels for the conveyance of petroleum, and, as they have proved to be a success, the works of Caird & Purdie, ship-builders, are being fitted up with machinery to produce these barrels. In the first place, these barrels, which are light steel, are made in halves by means of compression in a mold, when hot. Afterward they are welded together by means of electricity. The operation is in every sense a novel one, and will be watched with interest. The barrels are intended for use by the large oil-carrying companies engaged in the oil trade of the East.

MANY people have been troubled to explain why a high frequency current does not hurt a human being when it can illuminate. It has been recently suggested that the "skin effect" is such that, practically, there is no passage except over the surface of the body. Of course a very small current will serve a lamp if the "skin effect" also comes into play in the lamp filament, says *Invention*. But the experiments are said to have been tried with a powerful coil, when the pain was found to be unbearable before the lamp began to light up. This may have been because the frequency was lower. The experiment of lighting an incandescent lamp in series with the body has been exhibited in France, and since then by Campbell Swinton in England.

Two improvements in the treatment of nitro-glycerine are said to have been devised by M. Eduard Liebert. Both improvements are calculated to reduce the danger which attends the use of this substance. Ammonium sulphate or ammonium nitrate is added to the acid mixture during the operation of nitration by one of the improved processes, and has the effect of destroying the nitrous acid formed. The other "improvement" is an attempt, by adding isosoyal nitrate to the finished nitro-glycerine, to prevent it from congealing when exposed to low temperatures.

THE largest turret ship in the world, the Hood of the British navy, successfully passed the official trial of her machinery two weeks ago. She has a displacement of 14,150 tons, and under forced draught she made an average speed of 17 knots. The trial of her 67-ton turret guns was exceedingly satisfactory. The total cost of the Hood when fully equipped will amount to nearly \$950,000. She is a sister ship to the Royal Sovereign, except that her guns are mounted in turrets instead of barbettes.

TIN-PLATED YARN.—A method has been invented in Germany of covering tissues of cotton yarn with a flexible and brilliant deposit of tin. A clear paste of commercial zinc-powder and white of eggs is first made and spread on the textures with a brush, the coating coagulating when drying. The tissue is then placed in a bath of perchloride of tin, which metal is precipitated on the zinc; and the article, after rinsing and drying, is calendered, an operation imparting luster to the layer of tin.

Scientific Progress.

Falb's Earthquake Theory.

Zante's latest earthquake experience, in which the ruin began by the shocks of January and February of this year, was made complete, had far more significance to the world of science than to the other world of newspaper readers, which saw in it nothing more than a serious calamity to a people on whom disaster had already laid a grievous burden. The prediction of Rudolph Falb, made a few days before that Sunday, April 16th, would witness a renewal of earthquakes in places previously subject to seismic disturbance, seemed at the time to be preposterous. It turned out to be strikingly accurate, for Zante's rocking and swaying began on Monday morning, just a day later than the time set in the prophecy of Falb.

It is to be borne in mind that Rudolph Falb is in no way like the charlatans of this and other lands who make a business of predicting physical phenomena and who rarely fail to be ridiculously wrong on all points. Falb has a theory about earthquakes worked out from years of study and observation, which has attracted no little attention among the geologists, who never tire of considering that puzzle of the globe, the earthquake. Briefly stated, Professor Falb's theory is that the interior of the sphere is a slowly cooling molten mass—a vast, seething liquid sea—and that between us and this place of intense heat there lies a crust of undetermined thickness. Here and there the outer shell is weaker and thinner, or is cracked so as to form flues, and these are the regions of earthquake and volcano. The enormous volumes of gas generated in this glowing mass are continually and with growing force pressing against the earth's thin shell, seeking for escape. But further than that, Falb believes and considers himself able to prove that the molten interior of the earth is subject to the mighty and mysterious forces of solar and lunar attraction. This being so, at the seasons when the earth is most subject to these forces, tides of incalculable magnitude are formed in the sea of liquid fire and sweep throughout the earth's interior, adding the pressure needed to force a way out for the peat-up gases or to produce in conjunction with the other forces of contraction and expansion terrific explosions in the interior of the globe.

Four years ago the theory of Falb was fully discussed before the technical society of the Pacific by Otto von Geldern, the Secretary of the society. From him has been obtained some account of the matter which has never before been explained in a popular way.

Falb was led to consider ten principal conditions which may be summed up as follows: That there are three motions in earth tremors, a heaving upward, an undulation of the crust and twisting or whirling motion, the last accompanying violent shocks; that the first shock, though short, is the most violent, beginning with a slight tremor and increasing till it culminates in a final sharp explosion, being followed by lighter secondary shocks, which decrease in violence till the seventh day, and then increasing somewhat and ending the disturbance; that a peculiar rumbling generally precedes, but sometimes follows, a series of shocks; that earthquakes are often attended by peculiar electrical conditions of the atmosphere; that littoral tremors, if violent, are followed by tidal waves; that changes in the level of coast and sea bottoms, as well as changes in ocean currents, often follow catastrophic shocks; that earthquakes are sometimes directly followed by heavy rain showers; that the area of tremor is more or less elliptical, the motion being transmitted in circular waves from the epicentrum, the point where the shock, received from below, is most violent; that where there are high mountain ranges earthquakes are the most frequent, the frequency being greatest in or near the tropics.

The most interesting portion of Falb's theory is that expressed graphically in curves showing the ratio of distribution as between the months. Of this Mr. von Geldern writes

"We find a certain similarity in the structure of these curves to all preceding ones, with the April and October maxima a little too prominently developed, but with a decided minimum for the summer months. Certainly, language cannot speak plainer than do these graphic illustrations, as they bring out, at random as they are taken, again and again the facts to which we have called attention. Can this be a matter of chance? Would it seem so unreasonable to suppose that the January maximum may be caused by the earth's perihelion; the April by the sun's position in the equator (about

March 20th, when two forces—the centrifugal force of the earth, and the attraction of the sun—are operating in harmony); that the June minimum may be due to the earth's aphelion, when the sun's attraction is least; that the October rise is brought about by sun's reaching the autumnal equinox, September 23d; that the fall for November is due to the sun's increase in southern declination, and that as the earth sped toward perihelion the curve of frequency would again reach its greatest height?

"Falb says there can be no reasonable doubt about it, and if these curves teach anything they teach that nearness of the sun stands out as the principal factor, assisted perceptibly by the equatorial position of the sun as a cause for the greater frequency at such seasons of the year."

The second factor Falb finds to be the moon's power of attraction, in which conclusion Mr. von Geldern agrees.

Water in the Spheroidal State.

While carrying on a piece of work recently which involved the use of a common Liebig condenser, it was noticed that where the stream of waste water fell into the water-trough, the bottom of which was rough, small globules of water were formed, which darted out on all sides and ran on the surface of the water to the sides of the trough, eight or ten inches distant. Frequently they would rebound from the side and start back, but would soon disappear. The globules varied in size from an eighth of an inch in diameter to very minute. Sometimes while running along they would gradually decrease in size until they would disappear, while others would disappear in an instant. In a few cases the size suddenly decreased to about one-half the original diameter, the globule then continuing on its course without further change, until it at last suddenly disappeared. Sometimes two globules would run together, combine and continue on their course as one globule of increased size. In other cases, instead of combining, they would rebound from each other like rubber balls. This rebound also took place when they ran against an air bubble. In one case a globule about one-eighth of an inch in diameter reached the side of the trough and rebounded, but it was reduced in size to about one-half of its original diameter. It was noticed, also, that they did not all move with the same velocity; some shot across the water with great rapidity, while others moved very deliberately, both kinds of movement taking place at the same time and in the same direction. In rare instances the globules stopped and lay at rest on the surface of the water until their final sudden disappearance. The rapidity was always greatest at the beginning. In order to ascertain how rapid a current there might be (the water was about a quarter of an inch deep), bits of wood were floated on the surface. The current thus indicated was many times slower than the movement of the globules.

Particular attention was given to ascertain at what place the globules originated. The falling stream made a circular depression in the water about an inch in diameter. The globules seemed to spring up from the outer edge of this depression, fall back on the surface of the water, and then run rapidly away as described above. The thought suggested itself to me that many, if not all, of the observed phenomena could be accounted for by rapid-whirling motion of the globule. The gradual slackening of the motion, the fact that some stopped on the surface of the water, the quick rebound from the sides of the trough, are all effects which can easily be produced by a rapidly-whirling ball on a plain surface, like the well-known movements of a billiard ball. This would also account for the phenomenon of a ball of water floating on water without blending with it, somewhat on the same principle that stones can be made to skip over the surface of water without sinking at once, or, more remotely, as the pitching of a curve in base-ball. The conditions, too, at the place of origination of the globules, were just such as would produce a sharp twisting motion. The falling stream was first turned to the side by the bottom of the trough and then upward, until at the top of the rebound the little globules sprang out.

I do not recall ever having seen the above explanation given, and so it is offered for what it is worth.

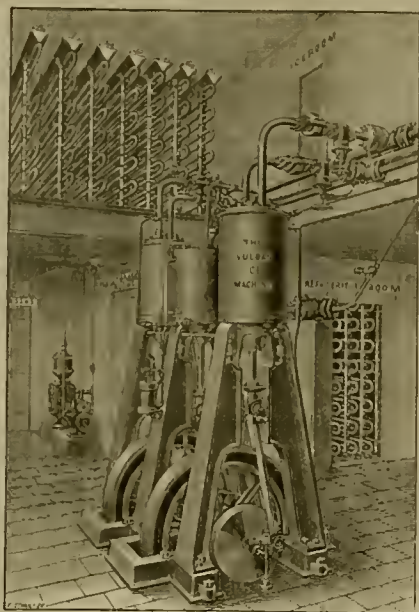
The temperature of the water was never above 30° C., which would preclude the common explanation for high temperatures. Afterward the same effects were obtained, on a smaller scale, when the prongs of a large vibrating diaphan were dipped into water to show the effects of vibration.—C. H. Ehrenfeld in Science.

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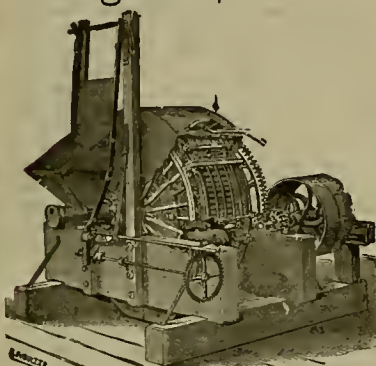
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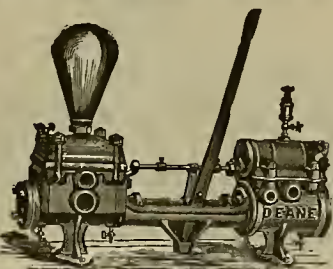
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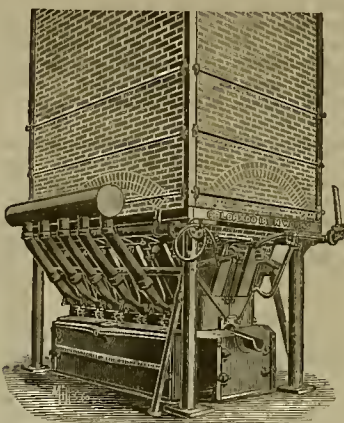
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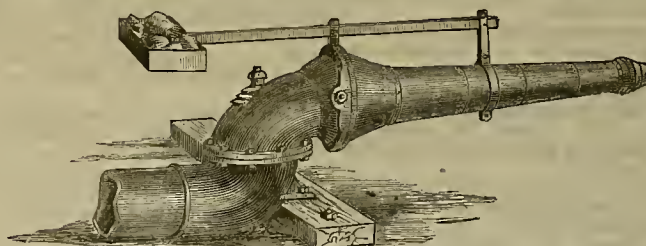
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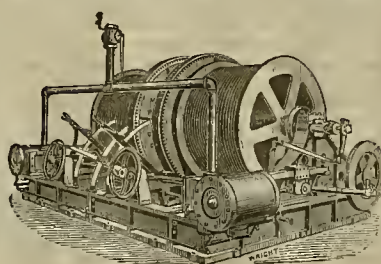
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Useful Information.

Mechanical Theory of the Corona.

The *Herald's* correspondent at Valparaiso cables: Professor Schaeberle has sent the following account of his observations of the total solar eclipse at Mina Bronces: "Sunday was a pleasant day for viewing the eclipse. The corona was very brilliant and much extended in all directions. It was similar to the corona of the eclipse of 1883. Eight photographs, 10 by 20 inches in size, were obtained from the heliograph; ten photographs were secured with the six-foot telescope, and the same number with the three-foot telescope. I also obtained six photographs with the one-foot telescope, and seventeen camera photographs with the forty-foot glass.

"These photographs demonstrate the enormous prominences, and also show solar clouds nearly 100,000 miles in height, floating around through space. The solar rays and others were long, conspicuous and trumpet-shaped in outline. The preliminary results are a strong confirmation of my mechanical theory of the corona."

Prof. E. S. Holden, of the Lick Observatory says: A cipher telegram received from Professor Schaeberle in Chili informs us that the Lick Observatory expedition to observe the total solar eclipse has been successful in every respect. The mechanical theory of the solar corona formed by Professor Schaeberle has been verified.

A drawing of the corona of April 16th last was published by him in January last, with a prediction as to what this corona was to be like, and I understood his telegram to mean that the picture made by him months ago was a true representation of the actual corona visible at the eclipse. This is an important verification of a very far-reaching theory.

The expansion of the solar corona was first photographed at the California eclipse of January 1, 1889, and was fully described in the Lick Observatory report of that eclipse. Its existence was doubted by various European astronomers, and the cloudy weather did not allow it to be plainly photographed at the eclipse of December, 1889. Now, however, Professor Schaeberle has telegraphed that it has been again successfully photographed at his station high up in the mountains.

Fifty photographs have been secured by Professor Schaeberle and his assistants, who used three different telescopes. One of these instruments gives an image of the sun four inches in diameter, and the corona covers a plate eighteen by twenty-two inches. The whole programme was satisfactorily carried out.

It is only proper to add, the expenses on the Lick Observatory expedition were generously provided for by a gift from Mrs. Senator Hearst of California, to whom science thus owes a new debt.

Oranges as a Medicine.

It cannot be emphasized too strongly, especially at this season of the year and in this part of the world, that pure fruit juice is one of the best blood-purifiers and system-regulators there is. In fact, it is said to be the base of physicians' prescriptions in cases of depleted systems and impure blood. There are people in this place who testify to this fact, particularly as to oranges. Some people, who have heretofore eaten fruit between meals or just before retiring and condemned it as injurious, have learned in California to eat one or two oranges with nearly every meal, particularly breakfast, and have found to their pleasant surprise that it was better than any medicine they had ever taken.

Many remarkable things have been claimed for oranges taken as a food, such as making the complexion clear and beautiful, curing the drink habit and numerous other things as varied and marvelous as the achievements of corn medicines, and there are, doubtless, persons who have made themselves miserable and ridiculous eating oranges by the wholesale in the endeavor to accomplish some such impossible result.

But thousands of persons can testify that a judicious use of oranges is a good thing; but a few precautions must be taken. In the first place, buy nothing but good fruit, especially ripe fruit. Green or bad fruit cannot be good for anybody. Then, if you do not eat the orange out of the shell with a spoon as many prefer to do, be sure to peel it carefully. The white pith lying beneath the yellow rind is one of the most indigestible substances known in the vegetable world. It is better to eat oranges with a spoon and take as little as possible of the cellular matter. Do not eat too many oranges at

first; but if the habit of eating them with meals is once formed, a person will never be satisfied to eat a meal without fresh fruit of some kind. The habit will work wonders in a short time toward regulating the system, keeping the blood in good condition and creating a healthy appetite.—Pomona Progress.

Cholera, Its Cause and Prevention.

At the State Sanitary Convention held in this city last week under the auspices of the State Board of Health, Dr. Geo. C. McDonald of Sausalito, submitted a very able paper, "Cholera, Its Cause and Prevention." The speaker reviewed the history of cholera from 1669 to the present day. It had been proven, he said, that air had little, if anything, to do with spreading the disease. It was disseminated through the medium of water, food and merchandise. This was shown by the fact that the disease followed the line of commerce, moving neither faster nor slower than people and freight moved. The bacillus of cholera lives in butter a month, in beer five days, in cheese curds not quite a day, in hoiled milk, if the cholera germ is added after the boiling, it will live indefinitely, in white wine it lives but five minutes, in red wine fifteen minutes, in cold coffee two hours, in cold tea nine days and in strong tea an hour. In spring water the cholera bacillus lives to eight days, in well water three months. It lives in ice, is propagated best in warm, damp places and is only killed by boiling.

As a prevention, while favoring inoculation by Koch's method, he was aware that even that remedy would not afford complete immunity. As for quarantine, personally he considered it absurd. What was the use of imprisoning people and fumigating them when the ships with cargoes of sugar, etc., in which tens of millions of cholera germs were living, come into port untouched. Absolute quarantine was a commercial impossibility, and anything less was useless. If he could have his way he would have in every city, town and hamlet corps of competent inspectors to make a house to house canvass and clothe them with authority to compel the people to keep themselves and their premises clean. Disinfectants should be furnished by the State and lavishly used. There should be no public funerals, and the bodies of all persons dying of cholera should be cremated. Then he would have slips printed in every known language as follows, and distributed to every house should cholera make its appearance in the State:

Keep your house well ventilated, light and thoroughly dry; do not wash the floors, but give them a dry scrub. See your air shafts, traps and drains are in perfect order; see your dust-bin is frequently emptied and its contents disinfected. Burn in your stoves all rags, vegetable refuse, such as cabbage-leaves and potato peelings. Sever all direct communication with the waste-pipe of the drain. Cleanse and wash out all your water-pipes and tanks. Let every drop of water used for drinking or washing be boiled before use. Do not use boiled water which has been standing for six hours without again boiling. Never use ice in any form; it may contain the germ of disease. In the same way and for the same reason avoid ice-cream and candy and tinned provisions. Never use filters, for if not kept perfectly clean and in working order they are simply deathtraps. Do not eat any raw fruit or salad, or bread more than twenty-four hours old; bake your own bread if practicable; if not use toast. Take no milk unless it has been previously boiled. Use no syrups of any kind; eat no butter; avoid weak cold tea; hot coffee is the best drink. Take four wholesome meals a day. Do not overload the stomach. A meal may consist of any sort of nutritious food, fresh and thoroughly cooked meats and fish, well-toasted bread, well-boiled green vegetables and potatoes, plain farinaceous pudding, eggs, etc. Alcohol must be taken in great moderation, only at lunch and dinner. Avoid purgative medicines, excesses, irregularities of every kind, over-fatigue, prolonged watching, excitement and undue mental strain on anything which will exhaust or irritate the nervous system. If cholera symptoms appear go to bed in airy room. Keep warm and send at once for your doctor. Drink hot lemonade, and if weak take a little old brandy well diluted. Drink one-half pint of the following mixture every morning: Thirty drops diluted sulphuric acid in a half pint of boiled water adding sugar to taste.

PAPER CAR WHEELS.—Of course you notice that a Pullman car is much easier to ride in than one of the ordinary cars. You attribute this to the superior springs, perhaps.

The springs, of course, make a difference, and the springs on a Pullman cost probably ten times as much as the springs of an ordinary car. But in reality the springs are a small matter. It is the wheels that make the great difference in comfort and safety, and Pullman wheels are expensive articles. Every wheel on every Pullman car is made of paper. You do not see the paper, because it is covered with iron and steel. The body of the wheel is a block of paper about four inches thick. Around this is a rim of steel from two to three inches thick. It is this steel rim, of course, which comes in contact with the rails. The sides are covered with circular iron plates, bolted on.

Electricity.

The Electric Welding Process.

In a paper read before the Carriage Builders' National Association, Mr. Frederick P. Rnyce, of Boston, thus describes the electric welding process:

To heat a piece of metal by electricity, the method in practical use is to pass an electrical current having an enormous volume through the piece to be heated. Similarly, if we desire to weld two pieces of metal by electricity, we force through the pieces a current having a volume so great that the metal, on account of its resistance, cannot carry it without rapidly inducing heat. In case the current is forced through the continuous piece of metal, the heat produced is equal throughout; but if we pass the same current through the two pieces of metal touching each other, the resistance is greatest at the point where the two pieces touch, and the heat is necessarily produced there first. Two pieces of metal cannot be brought so closely together that the resistance at the point of contact will be as low as in the solid metal; consequently, the heat is necessarily first produced at this point, and after it is once generated the resistance at this heated point increases, for the reason that hot metal is always a poorer conductor of electricity than cold metal. It is consequently a building process. The ratio of increase of resistance and the increase of heat at the desired point become practically constant. When the metal reaches the desired welding temperature the pieces are forced together by end pressure, and a butt weld is made. This pressure for small sizes of work is supplied by various forms of hand-levers, but in larger welding hydraulic pressure is ordinarily used, the hydraulic cylinders for the purpose being a part of, and attached to, the welding machine. The result of this end pressure is an enlargement or upset of the metal at the point of contact, the size of the upset depending upon the section of the stock welded. This may be removed in various ways, as will be hereafter described.

There are two distinct types of electric welding apparatus for producing the above results. The first machines built were planned for what is known as the direct method of welding; those built later and in more general use to-day are of the indirect type and specially used for larger work. In the former the dynamo and welding apparatus are combined in one machine, the current passing directly from the collector rings of the generator to the piece to be welded. In the indirect type, the dynamo and welder are separate pieces of apparatus. The dynamo is complete in itself, and can be located near the source of power, connected by wires carrying the current generated to the welder, which can be placed in any convenient location for the work to be done, and at a distance of several hundred feet from the dynamo, if necessary. This makes it possible to place the dynamo or generator in an engine-room, or near the source of power, and in charge of the engineer, so that it can be looked after at little or no extra expense. One or more welders can be distributed through the works; and, in localities where there may be no arrangements for power, but where they can be conveniently operated, several welders can be run from one dynamo, and there are already instances where five, six or more welders are placed in different buildings and on different floors, running constantly from a common dynamo and fed from a never-varying pressure. The direct apparatus above referred to is found to be advantageous for small work, as the welding of wire, cotton ties, rims for baby-carriage wheels, etc., and where cleanliness at the point of welding can be observed. For all larger work, however, the indirect apparatus is far preferable. The dynamo is of special construction, and varies materially from that used for lighting purposes, and yet can be so built, if desired, as to furnish current for incandescent lamps needed in the works where the welding plant is placed. The dynamo

generates an alternating current of 300 volts, which is less than one-third of that required for the lowest potential primary circuits used for lighting purposes, where an alternating current is generated.

The welder itself consists chiefly of a transformer or converter, in which the current of electricity generated in the dynamo is changed from one having a reasonably high electro-motive force and varying volume to one having a very low electro-motive force and an exceedingly large volume. This converted current is carried through an electrical circuit made up preferably of massive copper and the pieces which are to be heated for welding. That is to say, we have a circuit which is made up of several feet of heavy copper and a few inches of iron, steel or other metal to be welded, in which the voltage is so low that no shock can possibly be given the operator and no danger whatever can result therefrom. The power of conducting electricity, which the copper possesses, is so high that practically no heat is caused in this metal by the electrical current passing through it, but as the current passes through that part of the circuit, consisting of the pieces to be welded, the resistance through these pieces is so high that a welding heat at the point of junction is quickly secured. This heat is perfectly and absolutely regulated by reactive coils and other forms of apparatus. The work is never hidden from the operator, as is necessarily the case in a forge fire; the necessary pressure can be applied at exactly the right moment, and uniformly good results are obtained. No detrimental foreign matter can be introduced into the weld, as is frequently the case when coal or coke are used, and any impure substance existing in the metal in the immediate vicinity of the weld is ordinarily expelled by this welding process. To illustrate this, it has been frequently shown that if a piece of iron, after being electrically welded, is ground or planed off and etched with acids, the structure of the metal at or near the weld will be closer and finer than in the original bar, and thorough and exhaustive tests made upon the welds show that an absolutely perfect union has taken place. The metal becomes homogeneous at the point of welding.

ELECTRICAL GENERATORS FOR CHEMICAL LABORATORIES.—Discussing the subject of generators in chemical laboratories, the London *Electrician* says: "Primary batteries are out of the question; a thermo-electric battery by itself is not sufficient, but joining it with storage cells a very simple and practical generator is obtained." Such a one is described by Dr. Erbs in the *Chem. Zeitung*. There are eight small accumulators of eight ampere hours each and a Guelcher thermo-electric battery of 66 elements. The accumulators may be grouped in any way desired; a resistance box from two ohms down to 0.1 ohm; a Gaugain galvanometer and a commutator are also provided. The thermo-electric battery is heated by gas and needs no governor. Its mean voltage is 4.1 and its internal resistance is .68 ohm. The gas consumption is 170 to 180 litres per hour; each accumulator contains one positive and two negative plates and about a quart of acid. It has a mean voltage of 2.05, an internal resistance of .05 ohm and a maximum current of three amperes. Work of the most varied character can thus be done. The accumulators are connected in parallel for charging, which can be effected in 30 hours. If kept clean they are said to retain their charge for months. This arrangement is said to have worked very satisfactorily in a laboratory in Freiburg.

LIQUID FUEL.—Another engine fitted with liquid fuel has been running on the Great Eastern Railway, England—one of a class of 10 similar express engines—and, as compared with the other nine engines doing the same round of duty, is reported as doing efficient service, that is, the oil-burner has consumed about one-third the weight of coal per mile and about as much oil as coal in weight, her total fuel being thus about two-thirds by weight what it would be if all coal, and the liquid practically giving an efficiency of double its weight of coal. The engineer's account is interesting in relation to this engine when burning mixtures of plain gas tar and creosote residuals, warmed up in the tank, which is placed at the rear of the tender, to a liquidity sufficient to cause it to flow freely through the injector pipes and to destroy its viscosity so that it would spray finely from the nozzles. Its behavior in the furnace he states to be satisfactory, filling the fire-box with white flame, the air rings also admitting of the most delicate adjustment of the supply of air for effecting combustion without air excess.

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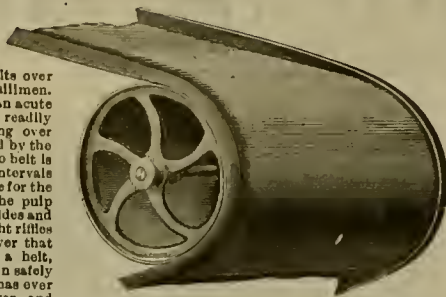
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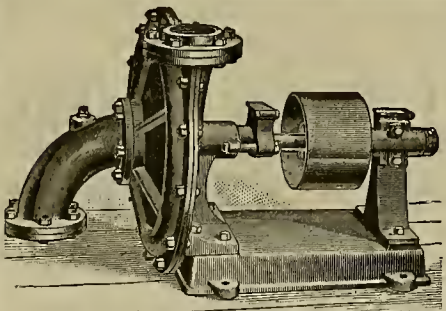


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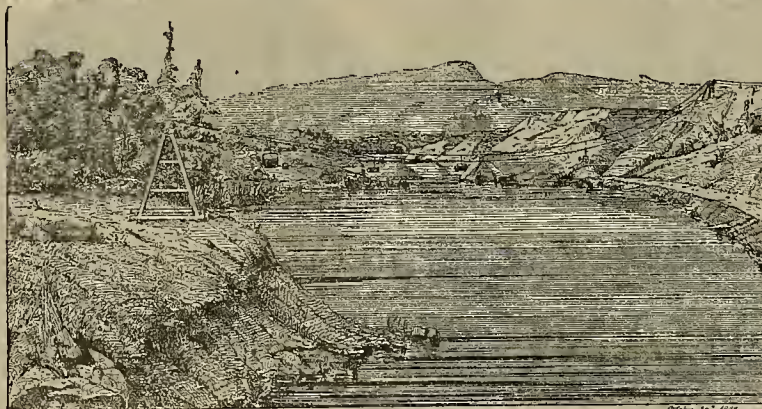
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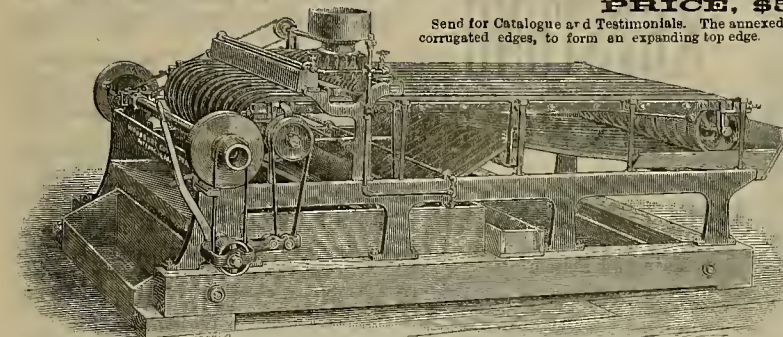
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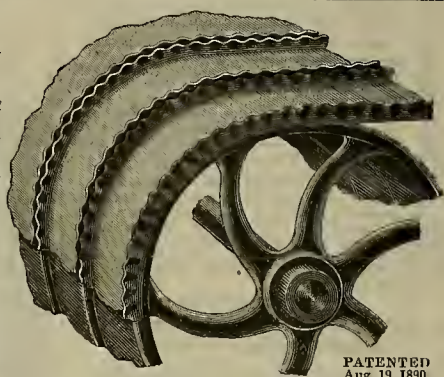
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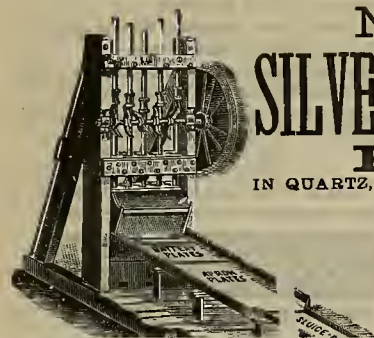


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(Copy) Yours faithfully, S. HARRIS, Manager.
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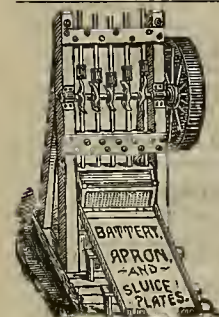
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MIDDLE BAA.—Amador Record, April 20: Middle Bar, on the Mokelumne river, is now experiencing quite a mining boom. Mr. Pine, on the south side of the river and adjoining the Astoria and Farrel mines, has 15 men on the pay-roll building roads and grading out for a mill-site. Col. Robinson has organized a company of Eastern capitalists and will open up the Gabvanea mine. The Albany and Farrel Companies have bids in for several hundred feet of roadway from the north bank of the river in to their properties. The Hardenburgh folks have cleared their shaft of water and debris and are now sinking below the 600 level. The Littlefield and Astoria tunnels of the Albany mine are being pushed ahead as rapidly as labor and powder will permit. The faces of both tunnels are penetrating stringers of quartz and are nearing the main ledge. The Middle Bar residents are circulating a petition asking that a postoffice be assigned there. The Amador Gold Mining Company (Limited) of London, England, whose property is located in the Jackson district, this county, has recently issued a prospectus outlining a plan for future action and calling a meeting of the directors. Litigation of a complicated character has been pending for some time between the English and American stockholders. We can only hope that everything will be amicably adjusted and work resumed on the property. It is expected that the parties who have the Fagan mine handed will take the property before the expiration of the time next month. Mr. Fagan informs us that he has but little doubt that the sale will be consummated.

PLYMOUTH CO.—Cor. Amador Ledger, April 20: Many of our old superannated cranks are circulating a report that the Plymouth Consolidated Mining Company is going to start the works up again, which is a report without any semblance of truth so far as we can find out. At all events, if the mine does start, it will be at least two years before the works are in a condition to employ a full crew of miners; and, of course, the number of men that are employed and have steady work with good wages is what interests the people here.

BAY STATE.—The boiler at the Bay State gave way Tuesday night, and now the mine is again shut down and filling up with water. The Bay State has had what might be termed a hard time of it, with break-downs, pumps and water during the last few months. Supt. Jones says they have a Jonah somewhere, which, as soon as he is found, will be thrown overboard.

FOREST HOME.—Everything is very quiet. The Thomas-Bothwell hydraulic mine is running about the same. It is the largest hydraulic mine in this section.

GOVER.—The Gover is running along as smoothly as it is possible for a mine to run. They are handling a great deal of water in a 15-hour daily run of their electric pumps. They have just finished sinking to the 1200 level, and are now engaged in sinking a sump and running a drift. At the bottom of the shaft they encountered a rich but small vein, which is widening as they go in.

Calaveras.

COPPER.—Mountain Echo, April 22: It has been reported to us that Bat DeMartine recently struck a rich copper mine near his residence in Bear Mountain. The lead at the surface is about a foot wide and increases in width as depth is attained. The ore is said to be 90 per cent pure, or nearly in its virgin state.

Two men are now working the celebrated Brunner mine on shares and it is said they are doing well. This is one of the best mines in this mining section and time will prove it.

Savvaal miners were overcome by gas in the Stickle mine last Thursday. As soon as the accident was discovered the men were brought to the surface, and Dr. Dorroh was summoned. After considerable effort the men were resuscitated.

El Dorado.

Naw MILL.—Georgetown Gazette, April 20: The new ten-stamp mill now being put up on the French Hill mine near Spanish Dry Diggings will be ready for service in about two months. C. S. Hersey, the millwright, has charge of the work. The mine is owned by E. S. Hadley of Los Angeles, A. J. Johnston of Sacramento, and Geo. M. Odom of Spanish Dry Diggings. If the results prove satisfactory, ten more stamps will be added, as the lode is from 15 to 50 feet in width. The mill will be run by water power obtained from the California Water Company.

PUMPIO OUTFIT.—Amador Ledger, April 20: B. Levaggi has just received from the shop a fine water-wheel and pumping outfit for his claim at Dogtown, El Dorado county, which will be shipped up to the mine by heavy teams as soon as the roads are a little more settled.

Modoc.

WORK PROGRESSING AT HAYDEN HILL.—Adin Argus, April 20: Dan Ambrose was down from Hayden Hill last Saturday and reported work in the Tunneling Company's works progressing nicely and prospects gradually becoming more encouraging. The tunnel, during the past 16 months, has been extended 457 feet by the work of only two men, Mr. Ambrose and Dan McCrane. During the first 14 months' work, a distance of 250 feet was reached, making in all 707 feet. Tunneling is much easier than it has been, as during the month of March 37 feet of tunnel were made. The "Juniper" mine, at one time exceedingly rich and by far the richest mine at

Hayden Hill, is now worked by a company of which W. C. Howard is superintendent. They are at present working on a vein that pays about \$15 to the ton. Nothing of particular interest is reported of the other mines there. People of this valley look with interest to the development of the mining interests, as the prosperity of Hayden Hill means increased prosperity to Big Valley.

Inyo.

NEW MINE.—Inyo Independent, April 21: W. C. Wilson of Mojave has certainly developed a good mine near the south line of the county. The location is near the north side of Indian Wells Valley, about 25 miles northeast from Coyote Hole station. It is in the Argus range, where the chain ends on the edge of the plain. The ledge was well prospected, and the extent and value of the ore determined before anything else was done. From an average sample, Selby & Co. of San Francisco gave Mr. Wilson the following return per ton: Gold, \$134.73; silver, \$14.88; total, \$144.11. A small mill has been erected and is now about ready for work.

Nevada.

FINE GRAVEL.—Nevada Transcript, April 20: To-day the good news comes to us that the Manzanita Gravel Mining Co. yesterday struck a fine-looking body of gravel. Last evening they were in three solid feet of gravel, and as work is progressing the lead increases in size and richness. A number of pans of the gravel which were washed yielded a hundred or more colors, and it is thought that a few days' more work will land them into very rich ground. At no time has the Manzanita looked so well. It is evident that the Manzanita has not got the same channel as the Harmony, as in the former the gravel resembles in color that of the old Live Oak, of a very light color, while in the latter mine it is a bluish color.

MADE A RAISE.—A short time since the Anti-Debris Association, for lack of funds, reduced their spy force down to one man. Those left out in the cold spent their time in growling about not having received their pay, which amounted to several hundred dollars. Yesterday four spies arrived here and immediately left for the upper part of the county. So it is quite evident that the association has bled somebody for money and are enabled to put an additional force upon the trail of the wicked hydraulic miner. We do not believe there is any illegitimate hydraulic mining being done in the county, but the spies are here all the same.

THE MIDNIGHT MINE.—Edwin Tilley and others have bought the Midnight mine, located on Piety Hill, and will begin work right away. This mine has been worked in a small way at different times for many years, and some very rich rock taken from it. It is better known as the George Gray ledge. The new owners propose to go to work in earnest and open up the mine thoroughly. It is believed that a valuable property will be developed there.

CANADA HILL.—Nevada Herald, April 21: One of the most promising mining districts, where strikes are likely to be made this year, is that around Canada Hill and Banner Mountain. There has been a great deal of prospecting going on in that locality during the past year, and in a quiet way, but little being said about it. There are a dozen mines being worked steadily and upward of 40 men have been employed all winter. Old Banner is seamed with gold-bearing ledges, and a great deal of gold has been taken out of them, but we believe there is many a fortune in its rocky sides yet. There are a few mine-owners who are employing men at day's pay, but most of them are working on tribute or prospecting for themselves. It is to be hoped that their patient labor will be rewarded. The Martin Bros. property is said to be about the most likely mine in the neighborhood, though the North Banner is again in good ore and may take a spurt. W. H. Vest is developing the Charonnet property for a Utah company, and several tributaries are taking out rock from other ledges, which will be crushed at custom mills. The persistency and confidence with which this prospecting goes on month after month ought to be sufficient to attract capital to the Canada Hill district.

HAULING ORE.—Grass Valley Telegraph, April 20: For some time past parties have been taking out ore from the Balla Union mine near Allison ranch. Quite a number of loads have been extracted from the ledge, and they are now being hauled to the southern mill. Crashing was begun on the rock yesterday, and it will take several days before the final result of the work is known. The parties expect a pretty fair yield, although the gold in the ore so far is very fine.

WILL BUILD A MILL.—Grass Valley Telegraph, April 16: The Baltic mine is looking very encouraging at present. We are reliably informed that figures and estimates are being made with the view of building a mill. Mr. Hendy, who is here from San Francisco, has been down to look at the property and make estimates. In all probability a five-stamp mill will be immediately erected.

IDAHO-MARYLAND.—The negotiations between the Idaho and Maryland mine have not, as yet, "materialized." There are favorable propositions on both sides and Mr. Edward Coleman informs us that the business will be "wound up" one way or another in a very short time.

THE DABCO DRIFT MINE.—Transcript, April 19: Indications at the Derbec gravel mine give good reasons for believing that a new channel is being approached. Some coarse gold has been found in the new ground now being opened, and more or less gravel, indicating that there is a channel not far away. The old channel from which the company took out so much gold is nearly all worked out. Superintendent Wetzel is pushing the prospecting work and as

soon as the new channel is reached as large a force of men as can be worked to advantage will be put on.

TO RESUME OPERATIONS.—Several years ago a company dug a tunnel through the Rush-creek bend on the South Yuba river, with the intention of working the tailings from the river. The tunnel was mined and two or three runs made, but the results were not satisfactory and work was stopped. George T. Emery, the gentlemen who had charge of the work at that time, is here again and intends to resume operations and give the scheme a more thorough test than before.

THIRTY DOLLARS A PAN.—Saturday last a remarkably rich strike was made in the original Harmony drift gravel mine, which is situated on the Washington ridge about two and a half miles from this city. The strike was made in one of the west drifts and the gravel found is very rich. The first pan prospected yielded \$16 in gold. A handkerchief full of the gravel, weighing about six pounds, panned out \$15, being at the rate of \$250 per pound. Yesterday Superintendent Hothersoll panned out \$30 from one pan of the dirt. The gold is coarse, some of the pieces being as large as a dime, and the gravel is the genuine blue river-gravel, from which is emitted a peculiar odor that is characteristic of most of the gravel found in ancient river channels. The deposit averages from three to five feet in width, and is supposed to extend all the way down the ridge to the Manzanita mine. In this event the Manzanita and West Harmony drift mines have brighter prospects ahead, although both are looking very well at present. C. J. Brand, one of the stockholders, showed us a piece of petrified wood that was taken from the channel where the strike was made, which is about 500 feet below the surface. This is an unusual depth at which to find petrified wood. The petrification is black as charcoal, as though it had been burned, and clinging to it is a crust of gravel in which specks of gold showed plainly. It was underneath this wood that the richest prospect was obtained. The stockholders of the Harmony are jubilant over the rich strike and nobody has any stock for sale now. Everybody is glad of it, as the company has spent lots of money in opening the mine and have had all kinds of obstacles to contend with. We hope this rich gravel will last long enough for all the owners to be made wealthy from it.

OSBORN HILL MINES.—Grass Valley Union, April 22: The Osborn Hill mine has good prospects for future development and work is being progressed rapidly. A new hoisting works is in course of erection and machinery for the mine is on the way from the foundry. The old shaft, which was sunk to a depth of 500 feet, is being retimbered, and they will soon commence to sink from that level. The Conlin mine, also situated on Osborn Hill, is undergoing a change. The mill is being overhauled, and as soon as this is completed work will be commenced underground. Mr. L. P. Goldstone is superintendent of the above-named property.

ANOTHER RICH STRIKE.—Transcript, April 22: Michael Hussey has been prospecting a quartz ledge near his residence, in Willow Valley district, for a few weeks past. He has struck some remarkably rich quartz, which is literally filled with gold, many of the specimens seeming to be at least half gold. Yesterday Mr. Hussey took out rock that is even richer than that taken out when the strike was first made, and indications are that there is considerable more of it within easy reach. The ledge is only four inches wide, and being near the surface is evidently a spur or stringer for a larger ledge. It may prove to be a pocket, as this is characteristic of many small veins of quartz that are found to be unusually rich not far from the surface, but which, when sunk upon to any depth, develop into good-sized ledges of high-grade ore, though not so rich as the pocket portions found above. We trust that Mr. Hussey's present strike, if it is a pocket, will prove to be a good big one, and that the indications will warrant continuing work, with prospects of a good mine being opened. He and his son, John M. Hussey, the schoolteacher, worked a ledge in the same neighborhood several years ago, from which considerable very rich rock was taken, and we presume this recent strike has been made on a portion of the old ledge.

BRUNSWICK MINE.—Union, April 24: Work at the Brunswick mine is going steadily on. The mine is down to a depth of 700 feet, and they are taking out some good-looking rock. The mine keeps ten stamps running all the time. There has been a great deal of water to contend with, and the eight-inch pump on the property is hardly sufficient to pump all the water. About 15 men are employed at the mine and more will be put to work when it is opened up. Mr. W. A. Hawley is superintendent and he is fully capable of managing the mine. The mill is operated by steam and the hoisting apparatus is run by water.

Placer.

GOON MONTHLY YIELD.—Placer Herald, April 22: The Horman gravel mine at Iowa Hill, under the excellent superintendency of Mr. Elliott West, is turning out from \$18,000 to \$24,000 a month. This is not one of the biggest, but it is one of the best mines in the State.

Plumas.

GRANVILLE AND CRESCENT.—Plumas National Bulletin, April 20: The mining outlook of the two communities visited is encouraging. McGill & Standart will soon start their mill at Round Valley. The road from the mine to the mill is now being put in order for hauling ore, of which a large body has been developed, and that which will pay. It is rumored that the firm intend putting up a large mill in North Canyon below the mine. This done, ore can be mined and milled very cheaply. Doubtless this will be one of the most valuable properties

in Plumas. D. McIntyre is preparing to crush ore from his mine at Wolf Creek. He completed a mill last summer and made a short run. A large body of ore is reported, and it prospects well. Firminstone & Richards have been at work for several months past extracting ore from the Phoenix, and they will begin crushing it in a few days. The ledge is reported small but of good quality. In the Crescent mine, 400 feet below the surface, is an immense body of ore, at points nearly 80 feet wide and between well-defined walls, but as yet good pay in it has not been reached. Here is a chance for one of the biggest mines in the State. Should this body of ore develop a pay chimney, it would be a fortune to the company, make an extremely prosperous town of Crescent, inure to the benefit of Indian Valley largely, and scatter money in the county generally.

San Bernardino.

A BIG MINING DEAL.—Riverside Enterprise, April 23: Mr. J. H. Crossman of this city and San Francisco parties have just closed a deal for a group of mines situated in the Dry Lake mining district which is situated on the Mojave desert. The purchase price of the mines in question was \$100,000 and the sale was consummated through the instrumentality of Attorney A. L. Bartlett of this city. The mines in question have all been developed more or less, and sufficient work has been done to show the great value of the mines. Tests of the rock taken from the mines show them all to be rich in gold-bearing ore. The purchase of Mr. Crossman and associates shows ledges varying in width from 2 to 40 feet, and the rock assays from \$3 to several thousand dollars per ton. The location of the mines is accessible to railroad over a good wagon-road, and there is ample water supply to run a large stamp-mill. We were shown specimens of rock from the mines yesterday, and they certainly bear out the claim of Mr. Crossman when he says his company has a bonanza. Mr. Crossman leaves to-day for San Francisco to confer with his associates relative to further development of the mines in question.

Siskiyou.

PROSPECTING.—Yreka Journal, April 26: A party of mining men left Yreka on the 20th, to prospect some quartz ledges situated in Scott Bar district. If found to be as represented, they will without doubt open other properties, and assist in developing the minerals that for want of capital have so long lain idle. The party consists of W. W. Walters, J. B. Fort, J. H. Johnson, J. H. Harney and E. H. Hughes, all representative mining men, who will develop our mines, wherever any prospect of reward is possible. The Empire quartz mine at Empire Creek, Klamath river, begins to look well again, with prospects of a good paying ledge in sight. The enterprising owners have expended a large amount of money in developing it, besides erecting one of the finest quartz mills in the county. A. Ermo has disposed of the old Shores quartz mine in Quartz Valley to Andrew J. Myers the well-known mining expert, consideration \$3000. This is the pioneer quartz mine worked in the Siskiyou, and paid handsomely in the '50 period, by the old crude process of milling. A man named Nielson has found good prospects in Quartz valley, at Douglas Hill. He anticipates developing a rich paying channel of auriferous gravel extending throughout the valley and vicinity. Harry Campbell and Hall have made arrangements to put up an electric plant in lower end of Quartz Valley, for lighting, hoisting and other uses where power is needed, in developing drift diggings of rich paying gravel. The American Bar Co., operating a claim in Klamath river, at Ash Creek, below Hornbrook, is now pushing the work energetically with 25 men employed, and expect to take out considerable gold from now on, or as soon as bedrock is reached. This is one of the best rigged claims on the Klamath, all the machinery being worked by one immense current-wheel over 40 feet wide and 18 feet in diameter.

Shasta.

MULETOWN.—Shasta Courier, April 20:—It is expected that the quartz mines about Old Muletown will make a better showing this year than heretofore, otherwise "hope deferred" will make some people sick and produce a positive kick. The Schroter brothers are taking out very rich rock in the mine a mile north of town. The Drury brothers are also taking out very rich rock in their mine a mile south of town. They are running an arrastre.

Sierra.

CLEAN-UP.—Mt. Messenger, April 22: Wm. Hanley cleaned up about \$2800 for about ten days' work in his drift claim near Alleghany. It is said to be the prettiest gold ever seen in this part of the country. Frank Dunlivan was down from American Hill last Wednesday, and reported that Martin Meehan and son had struck a good prospect in their drift diggings on the north side of the hill. Supt. Robt. Forbes, of the Bald Mt. Extension mine, came over last Sunday and called on us Monday. Work is satisfactorily progressing up there, with over 30 men employed. The depth of snow is about five feet on a level.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, Apr. 21: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 15th floors above the sill floor of this level. 1600 level—Are repairing the main south drift and the east crosscut leading therefrom to the upraise connecting with the north drift on the 1500 also. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the upraise

No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. From the drift run west from these north workings, 27 feet up, the upraise started 50 feet in from the mouth of the drift, has been carried up 14 feet; total height, 55 feet; the top being in a quartz formation carrying a low assay value. Have continued to stope out ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Have extracted during the week from all parts of the mine 647 cars of ore, about 640 tons. Shipped to Morgan mill 658 1030-2000 tons of ore. Average assay value, per railroad car samples, \$31.18. The assay value per battery sample of all the ore worked at that mill during the week (630 tons), was \$26.97 per ton.

OPHIR.—500 level.—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level.—The second compartment to the winze which was sunk 52 feet below the sill floor of this level has been carried up from the bottom to the top and is completed. We are now ready to start a crosscut to the west from the bottom of this winze.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 21 feet; total length, 152 feet, continuing in a softer porphyry formation carrying clay separations and showing fine lines of quartz. 500 level.—Have continued making necessary repairs, jointly with the Ophir Co., in the west drift from the Ophir shaft on this level.

UTAH.—340 level.—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 14 feet; total length, 107 feet; in quartzite and clay formation of very low assay value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 15 feet, making the total length 297 feet; the face is in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 22 feet, making the total distance west of the joint shaft 3122 feet; the face is in porphyry and streaks of clay.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 22 feet, making the total distance west of the shaft 3122 feet; the face is in porphyry and streaks of clay.

ANDERSON.—On 420 level north drift from east crosscut No. 1 north, advanced 18 feet; total length, 235 feet; formation in face nearly all quartz of very low assay value. This drift is now being turned to the west.

GOULD & CURRY.—200 level.—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been advanced 9 feet; total length, 435 feet; face in porphyry. Sutrö tunnel level.—On this level we are still working to connect the joint north drift with the winze.

BEST & BELCHER.—200 level.—At a point in northwest drift, 230 feet from our south line, started west crosscut No. 2 and advanced same 20 feet, passing through porphyry, clay and quartz. 900 level.—The south-west drift started in west crosscut No. 3, 20 feet from top of upraise No. 1, 1000 level, has been extended 12 feet through porphyry and small stringers of quartz; total length, 112 feet. Also did some repairing on this level during the week. Sutrö tunnel level.—On this level we are still working to make the connection between our joint north drift and the Gould & Curry winze.

HALE & NOBECROSS.—In the main shaft have finished easing the timbers between the 900 and 1100 levels. Main Incline.—We continue making the necessary repairs. 1800 level.—Advanced west crosscut on our south boundary 22 feet; total length, 110 feet; face in porphyry and quartz. During the week have been repairing the main north drift on this level where necessary.

CHOLLAR.—Are repairing north drift, 450 level. We have completed retimbering the two north compartments of the main shaft above the 930 level. The east crosscut near south line, 930 level, is out 129 feet; face is in porphyry and seams of quartz.

POTOSI.—The east crosscut No. 3, 850 level, is out 365 feet, having passed through some streaks of quartz giving low assays. The upraise 75 feet south of Potosi winze, 930 level, is up 21 feet, showing a streak of fair-grade ore on the footwall, about 12 inches wide. The west crosscut from north drift, 250 feet east of Potosi winze, 930 level, is out 63 feet, the face of which shows four feet in width of fair-grade ore. Are putting square sets north and south from the top of raise, 1000 level. Extracted and sent to mill the past week 492 tons and 1250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 450 tons. On hand at mill, 127 tons and 750 pounds. Average battery assays, \$21.86; average car sample assays, \$23.53.

OCCIDENTAL.—The main north drift on the 750 level has been extended 10 feet; total length, 731 feet; face is in hard porphyry. The upraise above No. 2 winze in south drift, 750 level, is up 113 feet; the top shows two and a half feet of pay ore. The Zadig drift, Sutrö tunnel level, is in 931 feet; face in hard porphyry.

WARD SHAFT.—Are retimbering the shaft 20 feet from the surface.

EXCHERQUE.—Are yet engaged retimbering the Ward shaft.

KENTUCK.—We continue to extract from two to three tons of ore per day from the 160 level of the average value of \$31 per ton. The

east crosscut on line between Jacket end Kentuck, 1100 level, is in 11 feet and shows fair-grade ore. Have continued the main south drift south into Kentuck ground, end are timbering and preparing to stope ore for the mill.

ALPHA.—Are yet engaged retimbering the Ward shaft.

BULLION.—Are yet engaged in retimbering the Ward shaft.

APEX.—In the past week have been timbering winze; to be completed to-morrow.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week, making the total distance from north line, 98 feet, the face is in hard porphyry.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 20 feet; the face is in quartz, some of which gives fair assays. The south drift from No. 4 west crosscut, 800 level, is in a distance of 30 feet; formation, quartz and porphyry.

Alum Creek District.

GOLD.—Walker Lake Bulletin, April 16: Henderson & Hatton have recently made some very promising gold locations in Alum Creek district.

Cortez District.

ORE IN THE TUNNEL.—Central Nevada, April 21: S. Wenhan, managing director of the Cortez mines (limited), and Wm. B. Shaw were in town yesterday, returning from a trip of inspection to the Cortez property. They report the mines in first-class condition, some very important ore bodies having been struck in driving the main tunnel during the winter. The Cortez mines (limited) can produce bullion at a less expense than any other silver property in the State. Why? Because of the extensive ore reserves, convenience for fuel, cheap manner of reduction of the ores, careful and economical management. Look out for a boom at Cortez in the near future!

Ferguson District.

A RICH DISTRICT.—Salt Lake Mining Journal, April 24: A. H. Godbe, secretary and metallurgist of Bullionville, Nev., Mining & Reduction Company, paid the Journal a pleasant call this morning. We have made frequent mention of these works in our columns, and are gratified to learn that the system of reduction used by the company is giving very satisfactory results; so much so, in fact, that the capacity of the plant has been enlarged so that the company can treat the milling ores of Lincoln county, as well as the large dump of tailings, for the reduction of which their works were originally put in. Mr. Godbe has great faith in the future of Ferguson district, the home of the Magnolia and April Fool mines, and believes that this season will demonstrate that this district has a wealth of mineral. On the question of railroads, he is also sanguine, and predicts that inside of two years the mineral output of that region will be sent to market behind the iron horse.

Kennedy District.

EXCELLENT OUTLOOK.—Cor. Silver State, April 19: There are without doubt a number of very valuable ledges here which only want proper development to become remunerative properties. A few days ago Mr. Kennedy pounded out in a hand mortar a few pounds of ore taken from one of his mines, and I was greatly surprised at the amount of free gold this rock yielded. These mines are no longer an experiment. They have been so thoroughly tested by the milling of ores to make their value a safety. Mr. Charles E. Kennedy, the discoverer of the mines, is a thorough-going miner. He erected a large arrastre, in which he worked a number of tons of ore, which, although imperfect and saving only a portion of the valuable metals, yielded in the neighborhood of \$80 a ton in gold and about \$30 in silver. Not yet satisfied with this showing, the company, which is composed of Kennedy, Benton & Wilkinson, made a shipment last fall of several carloads of ore to Portland, Oregon, which was worked and made an average yield of \$80 a ton in gold and \$35 in silver. This thorough test at once permanently established the value of the mines, and the company went to work in earnest to develop them, and has several tunnels run along the ledges, varying in length from 100 to 400 feet, and ore taken from the ledge in all of these tunnels shows the same uniform richness. The ledge varies in thickness from one to four feet, its average being about three feet. The company now has three carloads of ore ready for shipment, which is all high grade, and from which it expects to realize enough to erect a small mill. The company has a large amount of second-class ore, which will pay from \$25 to \$40 a ton. This ore will not pay for shipment, but with a mill on the ground will yield a handsome profit. The company has just completed a wagon road to the mine and will commence hauling the ore to Winnemucca in a few days. There are about 100 claims located in the district, with about 15 or 18 open and under the course of development, all showing the same flattering results. The hills seem to be full of good ledges, and the man who comes to this district early will be fortunate, for such mines as this district is developing are not to be found every day. There is a grand opening here for some man to put up a custom mill, as there is enough ore now mined to give a mill steady work. Mr. William Wilkinson, an experienced miner, who has spent many years in the mines of the State, says he has never seen so many good ledges or a more flattering prospect for a large and valuable district. This morning, Lervier, Dwire & Co., of the Midas ledge, have taken out of their mine some very fine ore, which assays \$140 a ton in gold and is rich in silver, and they are highly elated with the prospect. There is an abundance of good water here, and Kennedy & Co. have secured the water right. In fact, with

a reservoir to hold the water, a supply sufficient to run a five-stamp mill six or eight months in the year could be had. However, there is plenty of timber in the vicinity to supply fuel for several mills. It is only a question of a short time when the value of these mines will attract capital, and I would not be surprised to see one of the biggest mining camps in the State spring up here this season, for the gold is here and it is only necessary to develop these mines to get it.

Marietta District.

RESUMPTION OF ACTIVITY.—Walker Lake Bulletin, April 19: Mr. Turner, of Marietta, was in town last Saturday. From him we learn that there is likely to be a resumption of activity in that camp. The Eagle mine, the property of Messrs. Pexson, Phipps and Turner, is said to be very valuable. The ledge is three feet wide and the ore averages \$20, which is said to be a low estimate. The owners have already 150 tons on the dump, and the work so far done demonstrates that the ledge is permanent. While in town Mr. Turner purchased the Endowment mill, which is four miles from the Eagle mine, and as soon as the mill can be put in shape, five stamps will be started on the first crushing. Mr. Turner is now in Mason valley to buy a team and wagons with which to haul the ore from the mine. The owners are going to work in a business-like and systematic manner, and there is no doubt that they will show up a fine property. It is also their intention in the near future to erect smelting works for the accommodation of the silver-lead mines of the district.

Tuscarora District.

NAVAJO.—Times-Review, April 21: No change in any of the workings. The stopes above the 350-foot level and 150-foot level are producing the usual output of ore.

BELLE ISLE.—Work has been confined to stoping above the 250-foot level. The stopes are without change and producing as usual.

ARIZONA.

TURKEY CREEK.—Prescott Courier, April 22: Mike Ryan is in from Turkey Creek. He reports having run through twenty-six tons of free gold ore from the Morning Glory mine, which proved satisfactory. Walter Wright, lately returned from Colorado, is in charge of the mill at which the ore was worked. The mill is known as the old Henzey mill, and Mr. Wright is said to be running satisfactorily on custom ore.

MINT.—J. M. Daly, of Minnehaha Flat, is at present running his arrastre on ore from the Mint mine, which averages from \$50 to \$100 per ton in free gold. He also owns the Florence mine, shipments of which went from 90 to 110 ounces per ton; but, owing to the present low price of silver, nothing is being done with this mine at present. The vein is from 12 inches to 2 feet in width.

MACHINERY.—Messrs. Stockton and Schultz, two mill men and machinists from Pueblo, Colorado, came in on Saturday evening's train. They are here for the express purpose, the Courier is told, to erect the machinery for the Bursen smelter, on Banning creek, and the quartz mill on the Jennings' group, Hassayampa district. They report that the machinery has been delayed on the road. J. H. Cordes and Ed. Duran own a very promising group of gold mines in the vicinity of Badger Springs. Two of these claims are undeveloped; two of them are sufficiently developed to show strong and well-defined ledges. One of the ledges is from 8 inches to 1 foot wide, the ore going \$50 per ton, gold. The ore from both contains about ten per cent copper. Plenty of water near by to run a mill by water power.

A VALUABLE GROUP OF MINES.—Tucson Enterprise, April 22: The Cleveland parties who recently purchased J. C. Johnson's group of mines in the newly formed mining district of Hiland in this county, have nearly completed their arrangements for incorporation, and are now expecting the articles from Phoenix. The new incorporation will be known as the Columbia Gold Mining and Milling Co., and Mr. Johnson will be its general manager. The group of mines is very valuable gold-bearing ore in slate and porphyry, the principal one of which, the Columbia, shows up an ore body from 3 to 10 feet wide, the ledge of which has been traced for more than 4500 feet. The average amount per ton will run from \$25 to \$30. Some of the ore however, is a great deal richer, as for instance that of the Morning Star, which runs very high. A good deal of work has been done on the group, and it justified the Columbia Gold Mining and Milling Co. in ordering the immediate erection of a 20-stamp mill and other works. The lumber has already been ordered for boarding houses and a store, which shows that they mean to prosecute the delving for the precious mineral with energy and at once. The mines are about eighty miles below Quijotoa, within five miles of the Sonora line, and the nearest railroad station to them is Gila Bend, from where a good wagon road leads to the Columbia. Wood and water are in plenty, and the outlook is extremely favorable for the new corporation.

RICHMOND BASIN.—Arizona Silver Belt, April 26: Joe Brewster was in from Richmond Basin on Tuesday. He reported mining as rather quiet in the Basin. Knickerherry & Lensberg, owners of the Bland claim, on which the rich nuggets of silver were recently found, are now prospecting the ledge, which is a well defined blanket ledge, and believed to be the same from which Henry Risbridge, years ago, got his big pocket of ore, which yielded about \$12,000.

OREGON.

RICH GOLD STRIKE.—An Associated Press dispatch of April 20th says: The tension of quartz-mining excitement in these parts, already pretty high, was increased a little to-day by reliable

news telling of a remarkable strike in the Willow Springs precinct near the old postoffice. The lucky prospector's name is Jacob Hirschberger, and so rich is the vein that yesterday morning he took out rock enough streaked with gold to easily bring a thousand dollars, and it is estimated that he has taken out no less than \$2500 since finding the vein a day or two ago. One remarkable thing about the find is that the vein was discovered right on the old overland stage-road and only 200 yards from the Willows Springs stage station, where, before the railroad's advent in this valley, all overland passengers on the old Oregon & California stage line waited while a change of horses was made. Several other strikes in the same vicinity have been made lately, and the hills are filled with industrious prospectors. The excitement has not been so intense in mining matters since the palmy days of old, when there was scarcely any other industry than mining in this section. At the Hammersly ledge near Jinnpoff Joe, men are reported as hammering out \$20 to \$40 per day per man with an old historic hand mortar. Mining strikes in this country lately have brought many mining men and capitalists from the outside to look over the country, and much outside capital will be at work developing the promising properties soon. A special dispatch to the San Francisco Examiner dated Central Point, April 25th, gives the following additional information: The richest gold strike in southern Oregon since the days of 1852 has been made within two miles of this place in the last week. The entire country is wild with excitement, and, if the present exodus to the hills continues, the town will be depopulated before the end of the week. Your correspondent to-day visited the scene of the Hirschberger strike. The rich pay streak continues to grow richer, and they are taking out gold in fabulous quantities. Within two hours this morning, more than \$500 in coarse gold was taken from the ledge. This mine is in the famous Willow Springs district, which has a gold-producing history dating back to 1852. Within a radius of one mile from the Hirschberger claim, no less than six rich pockets are being worked, from \$50 to \$200 being taken out each day by a single miner. One ledge contains pay streaks showing pieces of gold as large as a pea. The main body of the lode is free-milling rock that will run \$300 to the ton. Several thousand dollars will be taken from each pocket. The soil from the surface of all the ledges is filled with coarse gold, and is being sacked and stored. The excitement has reached neighboring towns, and prospectors are coming in on each train. It is estimated a million dollars' worth of gold is in sight in the Willow Springs district to-day.

THE GOON PROSPECTS.—Jacksonville Times, April 22d: Few people in this section realize the interest taken in southern Oregon mines abroad, and the great wave of mining immigration and excitement about to sweep over this valley. In Idaho miners report little else is talked about except the mineral resources and prospects of Jackson and Josephine counties, and ever since the recent shooting scrape in the latter, over the right to work a mine which has hundreds of equals in our section, the interest is growing rapidly. Even in Colorado the miners are contemplating a rush to this section. There will be many rich quartz pockets struck during the next six months, and quite a number of fine ledges uncovered. Southern Oregon has waited long, but her day has come. W. E. Jacobs has gone to San Francisco to have the rich ore which he and E. K. Anderson brought from D. Horn, at the time he sold the Last Chance mine, reduced or sold for specimens. It is so rich that the jewelers offer to take the whole lot for specimens, at almost the valuation of its weight in gold. When the jeweler's saw shaves off the specimen the flakes of gold shine like stars in the rock, making the richest ornaments conceivable. The ore now being taken from the mine is also very rich, and a carload of it will be taken to the smelters below.

UTAH.

SILVER KING.—Park Record, April 22d: The writer was reliably informed this week that the Silver King mine, with the developments of the past few months, has developed into one of the largest and richest mines in the camp, not barring even the famous Ontario and Daly properties. The vein has developed into a true fissure, is strong and loaded from wall to wall with high grade ore. The mine is proving a surprise to even the most sanguine of its owners, and considering the great demand for that class of ores, and the most excellent facilities of the property for ore extraction, the future of the property is indeed promising. After allowing reasonable amount of enthusiasm on the part of those who were expatiating upon the value of recent developments, it is safe to say that the King is one of the Park's future heavy and rich producers.

CRESCENT.—Preparations are being made at the Crescent mine to keep ore extractions up to the demands of the tramway and mill, and a vigorous summer's work may be looked for from that property. The Kansas City smelters, which have a contract for all Crescent ores are getting quite impatient for shipments to begin, as the ore is badly needed for fluxing purposes. The Anchor ore bins are full to overflowing and the local officers of the company are beginning to chafe over the fearful condition of the roads, which entirely prohibits hauling. The demand for fluxing ores and the favorable prices on lead would enable the company to make a good profit on its production.

SAMPLE MILL.—Work on the new sampling mill is being crowded on as rapidly as men and money can do it, a force of over fifty men being employed. Mr. Mackintosh is anxious to get the mill ready for work as soon as possible, feeling that the summer is going to be an active one in spite of the present gloomy outlook.

Market Reports.

The Markets.

SAN FRANCISCO, April 27, 1893.

It is a significant fact that President Cleveland has decided to ask the late delegates to the International Conference at Brussels to continue in that capacity at the May meeting. He will, however, consult with them and request them to formulate a definite proposal for the conference. While the President thus shows no disposition to interfere in this particular with the work begun by his predecessor, it cannot be said that he has modified his attitude toward silver. His recent utterance that treasury notes must be paid in gold is an adherence to his former utterances. What he may be compelled to do by circumstances is yet to be developed.

Treasury Notes.

The notes issued in payment for the silver bullion purchased from month to month have come in for a good deal of attention of late. These notes are redeemable in gold, silver or greenbacks at the option of the Government, and they are receivable for all dues. Redemption of these notes by the Government since July 1, 1892, has been as follows:

July.....	\$ 108,900
August.....	5,119,000
September.....	1,759,000
October.....	224,200
November.....	220,000
December.....	4,336,900
January.....	4,438,900
February.....	4,000,000
March.....	4,000,000
Total.....	\$29,106,900

The Government has the right to reissue the notes, and the net redemption for the above period is not easily determined.

METALS.—No important change has occurred in the metals during the week. Copper is weaker. Lead and tin are quiet.

San Francisco Metal and Coal Market.

ANTIMONY.			
Per lb.....	@ 14	English, lb.....	@ 18
BORAX.			
Refined, in car lots.....	@ 71	Silk Diam'd tool.....	@ 15
Powdered, do.....	@ 71	Pick & Hammer.....	@ 10
Concentrated, do.....	@ 71	Machinery.....	@ 5
COPPER.			
Bolt.....	@ 22	B. V. steel grade.....	@ 5 87
Sheet.....	@ 22	14x20 spot.....	@ 5 87
Ingot, jobbing.....	@ 14	Charcoal, 14x20.....	@ 5 87
Do, wholesale.....	@ 13	Do roofing, 14x20.....	@ 5 87
First Box Sheets.....	@ 22	Do, do, 20x28.....	@ 11 75
IRON.			
Bar, base.....	@ 3	Spot @ lb.....	@ 24
Norway, base.....	@ 41	COAL.	
STEEL.			
Spot.....	@ 24	Spot from yard—PER TON.	
English, 20 ton.....	@ 24	Williamson.....	\$8 00
Glenagair.....	@ 25 00	Gravel.....	8 00
Am. Soft, No. 1.....	@ 25 00	Nanaimo.....	8 00
Oregon Pig.....	@ 25 00	Gilman.....	8 00
Pugot Sound.....	@ 25 00	Seattle.....	8 50
Clay Lane White.....	@ 25 00	Coos Bay.....	8 50
Langdon.....	@ 25 00	Connell.....	8 50
Thorncroft.....	@ 25 00	Egg hard.....	12 00
Garteberris.....	@ 25 00	Cumberland, in sacks.....	18 00
Barrow.....	@ 25 00	Do, bulk.....	18 00
Carroll.....	@ 25 00	Walstead.....	7 25
OHIO IRON ORE.		Scotch Splint.....	7 50
Per ton.....	@ 10 00	Brynabo.....	7 50
LEAD.			
Bar.....	@ 48	West Hartley.....	8 00
Sheet.....	@ 48	TO LOAD—PER TON.	
Pipe.....	@ 64	Australian.....	8 37
SILVER.			
Drop, sizes smaller than.....	@ 80	Liverpool Steam.....	8 50
B. of May of 25 lbs.....	@ 80	Scotch Splint.....	9 00
Do, B and larger sizes.....	@ 80	Scotch Splint.....	9 00
Bag of 25 lbs.....	@ 2 00	Oradit.....	5 50
Buck, Bails and Chilled.....	@ 2 00	Lehigh Lump.....	11 00
Do, bag of 25 lbs.....	@ 2 00	Cumberland.....	12 00
QUICKSILVER.			
Homs trade, pr.....	@ 42 50	Englisb, to load.....	\$9 50 @ 10 00
Task.....	@ 43 00	Do, spot, in bulk.....	@ 10 00
		Do, in sacks.....	@ 11 50
		Cumberland.....	9 50 @ 10 00

Eastern Silver Markets.

NEW YORK, April 20.—Following are the closing prices for the week:

Silver in—					
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday.....	83 1/2	\$11 20	\$4 12 1/2	\$20 85	
Friday.....	83 1/2	11 20	4 12 1/2	20 85	
Saturday.....	83 1/2	11 20	4 12 1/2	20 85	
Monday.....	83 1/2	11 20	4 12 1/2	20 70	
Tuesday.....	83 1/2	11 00	4 05	20 60	
Wednesday.....	83 1/2	11 00	4 05	20 70	

Mining Share Market.

There has been rather a strong and active market in stocks during the past week and considerable business has been done. The movement commenced rather suddenly and has kept up well. A number of brokers' clerks had been notified that after May 1st their services would not be needed, but business has improved so that instead of fewer more clerks will be needed. On Monday over 52,000 shares of Comstocks changed hands. This should be very encouraging not only to brokers but to those who still pin their faith to the old lode. Doubtless if management of the properties was such as to inspire more confidence on the part of the public there would be more business. In another column is an article on this subject showing some improvement in the mining methods.

To the World's Fair!

WEEKLY EXCURSIONS!

Are you going? If so, call on or write to the undersigned before arranging for your trip. The SANTA FE ROUTE is the only line under one management from California to Chicago! Palaces and Tourist Sleepers through to Chicago every day without change! Excursions every Tuesday. W. A. BISSELL, G. P. A., 650 Market Street, Chronicle Bldg., San Francisco, Cal.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		No. AMT. LEVIED, DELINQUENT AND PAID.		SECRETARY.	
Alta M Co, Nev.....	43.....	15c.....	April 25, May 31, June 1.....	L Osborn, 309 Montgomery	
Beile Lulu M Co, Nev.....	18.....	10c.....	Feb 24, May 1, May 25.....	J W Pew, 310 Pine	
Brunswick Cons M Co, Cal.....	5.....	20c.....	Feb 24, March 25, May 5.....	J Stadfeldt, 309 Montgomery	
Bullion M Co, Nevada.....	41.....	25c.....	April 15, May 17, June 7.....	R R Grayson, 315 Pine	
Chollar M Co, Nevada.....	34.....	25c.....	April 17, May 21, June 13.....	C E Elhot, 309 Montgomery	
Cons Imperial M Co, Nevada.....	35.....	30c.....	March 20, April 25, May 17.....	C L McCoy, Mills Building	
Cons St. Gothard G M Co, California.....	7.....	50c.....	Feb 9, March 17, May 6.....	T Wetzel, 310 Sansome	
Dahlin M Co, Cal.....	1.....	10c.....	March 8, April 12, May 5.....	C F Hunt, 140 Sansome	
Evering Star M Co, California.....	3.....	10c.....	April 15, June 5.....	J J Seville, 320 Sansome	
Golea M Co, Cal.....	2.....	25c.....	March 9, April 24, May 15.....	D M Kent, 330 Pine	
Gould & Curry M Co, Nev.....	71.....	25c.....	April 10, May 15, June 5.....	A D Durbow, 309 Montgomery	
Gray Eagle M Co, Cal.....	32.....	25c.....	May 6, May 10, May 30.....	C O Harvey, 303 California	
Jackson M Co, Nev.....	14.....	20c.....	March 25, April 29, May 17.....	O R Jones, 320 Pine	
Jackrabill M & M Co, Nevada.....	3.....	50c.....	Mar 27, May 22.....	T Wetzel, 320 Sansome	
Lady Washington Cons M Co, Nevada.....	9.....	10c.....	April 18, May 23, June 13.....	L Osborn, 309 Montgomery	
Mexican M Co, Nevada.....	4.....	25c.....	March 10, April 20, May 11.....	D M Kent, 330 Pine	
Narajo M Co, Nev.....	25.....	10c.....	March 24, April 28, May 22.....	J W Pew, 310 Pine	
Norita Belle Lulu M Co, Nevada.....	23.....	10c.....	April 17, May 23, June 21.....	J W Pew, 310 Pine	
Occidental M Co, Nevada.....	12.....	10c.....	March 17, April 20, May 11.....	A K Durbow, 309 Montgomery	
Ophir M Co, Nevada.....	59.....	10c.....	March 7, April 21, May 1.....	E B Holmes, 309 Montgomery	
Pine Hill M Co, Cal.....	2.....	30c.....	March 22, April 27, May 24.....	C A Hare, Pier 5, Stewart	
Sierra Nevada M Co, Nev.....	38.....	30c.....	March 16, April 19, May 9.....	E B Holmes, 309 Montgomery	
Sierra Nevada M Co, Nev.....	14.....	25c.....	March 9, April 21, May 1.....	E L Parker, 309 Montgomery	
Union Cons M Co, Nevada.....	47.....	25c.....	March 18, April 21, May 11.....	C O Harvey, 303 California	
Utah Cons M Co, Nev.....	17.....	10c.....	March 24, April 20, May 15.....	A W Haves, 309 Montgomery	
Yellow Jacket M Co, Nev.....	54.....	25c.....	March 10, April 14, May 19.....	W H Hauvst, Gold Hill	
COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.	
Churub M Co, California.....	Annual.....	5.....	L Osborn, 309 Montgomery.....	Oct 20	
Cons Imperial M Co, Nevada.....	Annual.....	10.....	T Wetzel, 310 Pine.....	April 17	
Gover M Co.....	Annual.....	10.....	C E Elhot, 309 Montgomery.....	May 9	
Justice M Co, Nevada.....	Annual.....	10.....	R Doble, 15 Fremont.....	May 9	
Morgan M Co, California.....	Annual.....	10.....	K E Kelly, 309 Montgomery.....	May 1	
Scorpion M Co, Nev.....	Annual.....	10.....	L C Brees, 320 Montgomery.....	May 8	
			Annuel.....	G R Spinner, 310 Pine.....	May 8
COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.	
Buller Cons M Co, California.....	5.....	10.....	L Osborn, 309 Montgomery.....	Oct 20	
Chamblum M Co, California.....	10.....	10.....	T Wetzel, 310 Pine.....	April 17	
Cons New York M Co, Nevada.....	10.....	10.....	C E Elhot, 309 Montgomery.....	May 9	
Great Western Quickilver M Co.....	25.....	10.....	A Halsey, 328 Montgomery.....	Oct 8	
Mayflower Oravel M Co, California.....	25.....	10.....	D M Kent, 330 Pine.....	March 20	
Pacific Coast Borax Co, California.....	1 00.....	10.....	A H Clough, 320 Montgomery.....	Jan 10	
Standard Cons M Co, California.....	10.....	10.....	J W Pew, 310 Pine.....	Dec 23	

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, April 27, 1893.

9:30 A. M. SESSION.

600 Alta.....	20c	200 Crown Point.....	1.00
50 Andes.....	.50c	500 Exchequer.....	.50c
100.....	.60c	200 Hale & Norcross.....	1.25
150 Belcher.....	1.25	500 Keweenaw.....	.35c
100.....	.50c	100 Mexican.....	1.55
100 Bullion.....	.55c	100 Ophir.....	2.85
700.....	.60c	400 Overman.....	.35c
100 Bulwer.....	.25c	400 Potol.....	2.90
400 Con. Cal. & Va.....	2.75	750.....	2.95
600.....	2.75	300 Savage.....	1.40
550 Chollar.....	1.30	100.....	1.35c
300.....	1.25	400 S. B. Bior.....	.35c
200.....	1.20	50 Sierra Nevada.....	1.40
50 Confidence.....	1.75	700 Yellow Jacket.....	1.25

2:30 P. M. SESSION.

500 Alpha.....	27c	400 Gould & Curry.....	.87c
100 Alta.....	.15c	450 Hale & Norcross.....	1.10
500 Andes.....	.55c	100.....	1.15
100.....	.55c	100 Ophir.....	2.85
200 Best & B.....	1.50	100.....	2.85
200.....	1.65	1600 Keweenaw.....	.35c
400 Bullion.....	.50c	500 Potol.....	2.95
850.....	.50c	100 Savage.....	1.40
500 Bullion.....	1.10	950.....	1.25
100 Con. Cal. & Va.....	2.60	100 S. B. Bior.....	.35c
100.....	2.65	300 Sierra Nevada.....	1.40
1800 Belcher.....	1.20	500 Union.....	1.95
700 Crown Point.....	1.00	50 Utah.....	2.50c
400 Exchequer.....	.15c	500 Yellow Jacket.....	1.20

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING APRIL 18, 1893.

495,577.—WEENOH—J. A. Barker, Pasadena, Cal.	
495,876.—STAMP-MILL GUIDE—W. H. Brown, Angels, Cal.	
495,580.—CAR-COUPLING—J. E. Catterson, Dayton, Wash.	
495,783.—BEAM AND GIERE SUPPORT—F. Cavallaro, San Jose, Cal.	
495,622.—STEEERING MECHANISM—J. Christensen, S. F.	
495,623.—STEEERING MECHANISM—J. Christensen, S. F.	
495,784.—PEN AND PENCIL HOLDER—A. W. Coffin, S. F.	
495,880.—RAILWAY CAR STOVE—Mary E. Cook, Amity, Or.	
495,727.—SHIP'S PROPELLER—A. T. Elford, S. F.	
495,582.—GROUND GENERATOR OF ELECTRICITY—M. Emme, Oakland, Cal.	
495,792.—WATERING CART—H. E. Fairman, Bakersfield, Cal.	
495,794.—BEET-CULTIVATOR—W. V. Gaffey, Castroville, Cal.	
495,795.—CONCENTRATING BELT—Geo. Gates, Jackson, Cal.	
495,796.—EEO-POACHER—Clara T. Gott, Seattle, Wash.	
495,803.—HULLER & SCOURER—A. F. Hinz, S. F.	
495,945.—POTATO GRADEE AND SEPARATOR—A. J. McDonough, S. F.	
495,750.—WINDOW-HANGER—B. D. McEachren, S. F.	
495,825.—FIELD AND LAWN MOWER—D. M. Miller, Fairfield, Cal.	
495,829.—STEAM BOILER—L. A. Olsen, Oakland, Cal.	
495,639.—BEEHIVE-LOADING GUN—G. A. Sachs, Eugene, Or.	
495,843.—CAELE GRIP—H. A. Shipp, Atwater, Cal.	
495,860.—FRUIT-PITTEE—E. A. Weare, Selma, Cal.	

The following brief list by telegraph, for April 25, will appear more complete on receipt of mail advices:

California—John T. Burt, Tree Pines, wheel for single-track railways; Syron O. Clark, Pasadena, irrigation systems; Daniel F. Donegan, Los Angeles, re-matry; Daniel H. Faust, Stockton, vehicle wrench; Mattie L. Farrington, San Francisco, tap and faucet; Charles E. Hamilton, Los Angeles, assignor of one-half to A. C. Harper, university double-lap pipe; Benjamin Holt, Stockton, traveling harvester; Benjamin F. Howard, Sheep Ranch, lubricator; Frank W. Kringel,

Los Angeles, repeating action for upright pianofortes; Ogden Mallory, Auburn, trace buckle; Ralph Mazza, San Leandro, pencil-holder and sharpener; Thomas Merrill, Oakland, automatic car-ventilator; Alden W. Sanborn, San Francisco, axle lubricator; Edwin G. Smith and E. B. Brown, San Francisco, smelting furnace; William B. Ward, Los Angeles, stone molding and surfacing machine; Christopher H. Watson, Riverside, water gate.

Washington—Lucian F. Cook, two patents, elevated friction cable railway and elevated railway system; George T. Duncan, Tacoma, chin rest for horses; Peter Murray, Seattle, preserving timber; Albert P. Veneer, Seattle, musical instrument.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EXPLOSIVE ENGINE.—Frank F. Tremper, S. F., assignor to the Safety Vapor Engine Co. of New Jersey. No. 495,281. Dated April 11, 1893. This invention relates to the class of explosive engines and consists in the novel device for producing the spark by which the explosion is effected, and in the novel controlling valve for the cylinder. Heretofore in this class of engines it has been found very difficult to maintain the temper of whatever spring may be used either forming the electrode itself or controlling said electrode otherwise, because the heat very soon weakens and destroys it; but in this inventor's construction the spring, being located well within the piston, is removed from the influence of the heat, and this removal can be carried to any extent which experience may find necessary by simply increasing the length of the parts in order to locate the spring as far within the body of the piston as may be necessary to effect its complete isolation. The chief improvement consists in seating the valve directly and flat against the cylinder, either on its side or on its head, and in making the ports which the valve controls in the cylinder or its head. This arrangement avoids any open chamber in the valve chest, and, in reality, makes of the chest a kind of carrier for the valve stem and exhaust and gas connections outside. There are also other improvements in details of construction.

GAS COMPRESSOR.—E. Lawson, San Francisco. No. 495,348. Dated April 11, 1893. This invention has for its object the compression of gases, and is especially useful for compressing the vapors of ammonia or other similar medium as used in cooling or ice-making machines. It consists of stationary and movable cylinders and piston so arranged with relation to each other that the gas or vapor is first drawn into the larger outer cylinder and compressed from that into a second concentric interior cylinder of smaller diameter, and from this again into a third still smaller stationary concentric cylinder fixed to the same crown or cap with the outer cylinder. The main piston and intermediate cylinder are caused to reciprocate within the outer cylinder and outside the smallest one by means of a piston rod with which they are connected. Suitable passages and valves provide for the transmission of the vapor from one cylinder to another and thence to the receiver. A peculiar arrangement of ducts serves to convey a lubricant to each of the frictional surfaces from a common source of supply.

COMBINED HULLER AND SCOURER.—A. F. Hinz, S. F. No. 495,803. Dated April 13, 1893. The invention relates to the general class of hulling and scouring machines for mill stock. It consists of a combined huller and scourer, the essential features of which are a horizontally disposed opposing stone and runner and alternating sections of stone and screen encircling the periphery of the runner. The object of the machine is to provide a simple and effective machine which will both hull and scour.

NOTICE OF ASSESSMENT.

GOULD AND CURRY SILVER MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of works, Virginia, Storey County, Nevada.
Notice is hereby given, that at a meeting of the Board of Trustees, held on the 11th day of April, 1893, an assessment, (No. 71) of Twenty-five Cents (25c) per share, was levied upon the capital stock of the corporation payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 69 Nevada Block, 309 Montgomery street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 6th day of June, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.
By order of the Board of Trustees.
ALFRED D. DURBROW, Secretary
Office—No. 69 Nevada Block, 309 Montgomery street, San Francisco, California.

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This Compendium, having had many years experience in the mechanical arts, are enabled to judge correctly what is wanted for this class of people's book eaters.

An Exhaustive Instruction for Shop Office, and for Young Mechanics desirous of becoming perfect in their trades. Contains 498 Tables relating to metals, wood, and stone; 218 Rules to solve all mechanical difficulties. The Electrical Department, by a well-known Expert, is thorough and comprehensive. Prices, \$2.50. Special terms will be given to live agents. Apply now. LAIRD & LEE, Chicago.

PATENTS

BEST LEGAL ADVICE. BEST PATENTS OBTAINED.

DEWEY & CO.,
220 MARKET ST., SAN FRANCISCO,
WASHINGTON, D. C., LONDON, ETC.

CALIFORNIA MACHINE WORKS, WM. H. BIRCH & CO., ENGINEERS AND MACHINISTS, No. 119 Beale St., - - San Francisco.

—BUILDERS OF—
Steam Engines, Saw Mills, Mining Machinery, Dredging Machines, Rock Crushers, Cable Railway Machinery, Elevators, Air Brakes Co.'s Patent Steam and Hydraulic Elevators, Air Cushions and Air Brakes. POSITIVE SAFETIES. Improved Ram Elevators, Slidewalk and Hand Hoists. B. E. Hsrickson's Patent Automatic Safety Catches.

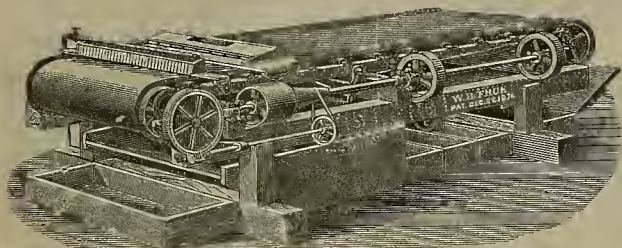
Machines of all kinds Made and Repaired. Orders Solicited.

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Send for FREE Circular to The Correspond

FRUE ORE CONCENTRATOR

OVER 3200 IN ACTUAL USE.



Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.

SAN JACINTO ESTATE, LIMITED,
Office of General Manager,
P. O. Address, South Riverside, San Bernardino Co., Cal.
CALICO, Dec. 18, 1891.

MESSRS. ADAMS & CARTER, 132 Market Street, San Francisco, Cal.—GENTLEMEN: After a continuous trial of different concentrators comprising the Frue Vanner, the "Holland," "Paradox," "Triumph" and the "Woodbury" concentrators, extending over several months, we find that we prefer the Frue Vanner, as it is easier of adjustment, runs smoother, has less wear and tear, and—having a positive travel—gives less trouble than the other more complicated and ever changing machines now in use here. The Frue Vanner not only saves cleaner concentrate, but has less loss in the tailings, and is in several ways preferable to the other concentrators here.
I am, my Dear Sirs, Yours faithfully,
S. HARRIS, Manager

For any information, or for pamphlets, or for circulars or testimonials, call on or address

H. J. SUMMERHAYES, Successor to Adams & Carter, Agent for the FRUE ORE CONCENTRATOR.
No. 132 Market Street. - - - San Francisco, Cal.

Price of 4-foot wide Plain Belt Frue Vanner.....\$550, f. o. b.
" " " Improved Belt Frue Vanner..... 800, f. o. b.
" 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

RISDON IRON WORKS.

{ Cable Address, }
"RISDON."

OFFICE AND WORKS:—CORNER HOWARD AND BEALE STS., SAN FRANCISCO, CAL.

Manufacturers of, and Contractors for

WATER WORKS
FOR
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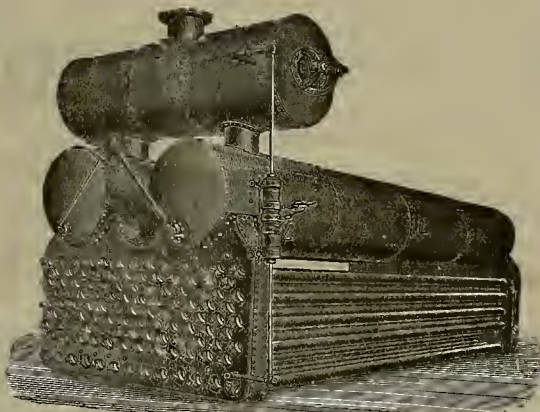
Improved Mining, Milling, Marine and Other Machinery,
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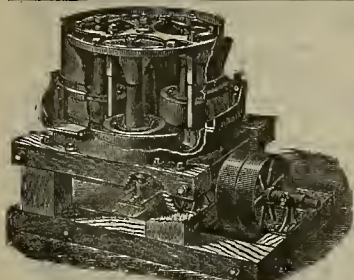
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A Hydraulic Mine at Work.

The cut on this page gives a bird's-eye view of a hydraulic mine and its surroundings. It was made from a photograph taken from the high ridge on the opposite side of the river from the mine and gives a very good general idea of the appearance of a typical mine of this character. The gravel banks on which the giants are shown at work are seventy to eighty feet high. Cuts

about forty feet deep are made in the bedrock for the sluices, and through these the gravel is washed, the gold being retained in the sluices and the debris passing to the dump on the river bank. This particular mine is on the Trinity river, a tributary of the Klamath, and as both of these are non-navigable streams no damage is done by the debris. The winter floods in the river carry off most of the debris deposited below the mine, so that there is always plenty of dumping ground. In some parts of the claim, not shown in the engraving, the waste material falls 50 to 100 feet over the edge of the bedrock cut, into the river. The 2,000 inches of water is brought through a ditch 10 miles long. The pipe-line begins on the high ridge shown in the foreground, and is led down the very steep mountain side and below the main one shown, which is a suspension bridge. The bridge alone cost \$30,000. The pipe then extends across, as shown, to the branches on the claim.

The mine shown is one of the claims belonging to the Hayes Red Hill property, near Junction City, Trinity county. The belt of gravel extends for miles along the river, and there are mines on both sides. There are other claims both above and below the main one shown, which are also worked by the same owner. The surface of this ground is utilized for farming purposes, and an orchard, there being plenty of water for irrigation.

There is nothing specially distinctive about this mine as far as appearance goes, though it is particularly well equipped, having among other things about a dozen giants, some of 11-inch diameter. The ground is rich and produc-

tive. The cultivated patches shown toward the front of the picture are over a bed of gravel which, though shallow, is exceptionally rich and will some day be hydraulicked off. Both mining and farming are carried on at the same time at Red Hill. The hydraulic mines in Trinity county, as well as those in Siskiyou, are fortunate in being in a drainage basin not connected with the Sacramento or San Joaquin rivers and are, therefore, free from the effect of any laws which control the gravel mines in those sections. There

The California Mining Exhibit at Chicago.

Telegraphic advices from the World's Fair are not specially encouraging with reference to some of the exhibits from California. The criticism on the mining exhibit implies inferiority, which was expected by those in this city who knew anything about the way it was being managed here. There was only a spasmodic attempt to make any collection outside of that furnished by the State

Mining Bureau, and the superintendent of the exhibit did scarcely any active work at all. The main reliance was placed on the collection of the Mining Bureau. While this in itself is good as far as it goes, a very much larger one and more diversified could easily have been obtained had there been an active, energetic man in charge of the whole department. As it is, most of the funds set aside by the State Commission for the mining exhibit will be expended in salaries. The exhibit of gold ores is said to be inferior, and the general make our exhibit is far excelled by New South Wales and by Colorado. The University of California has a magnificent collection of ores, rocks and minerals, part of which might have been obtained for the display, since they all belong to the State. In fact contributions from private individuals would have been abundant had there been any systematic effort to obtain them. There were several enthusiastic workers who endeavored to obtain employment under the commission to do this collecting, but they received no encouragement, and it was left to a few men with little interest beyond drawing their salaries. That the business was not properly attended to is evident from the criticisms in the public press, but this is no surprise to the mining men in this city. There was a magnificent opportunity to advertise the mining industry of California which has been neglected by those employed to attend to it.



BIRD'S-EYE VIEW OF A HYDRAULIC MINING CLAIM.

are no navigable rivers and no farming interests to be injured, so the debris takes care of itself as best it may. The Caminetti law does not apply to this northwestern portion of the State. The mines up there have never been closed down and probably never will be as far as any debris question is concerned.

THE Columbia Marble Mills, Tuolumne county, are now rushed day and night, running two shifts of nine men. One contract is for 5500 tiles for roofing the New City Hall in San Francisco. The saws and machinery are run by water power. The mountain of marble at the quarries is of superior quality, hard, durable, and susceptible of exquisite polish.

THE coinage of gold and silver at the United States Mint, in this city, for the month of April was as follows: Double eagles, \$540,000; eagles, \$290,000; half-eagles, \$440,000; dimes, \$40,000; total, \$1,310,000.

THE mill and pumps of the Lily mine, north of the San Joaquin river, not far from Fresno was burned on Monday. The mill was owned by the McDonald Bros.

MINING AND SCIENTIFIC PRESS.

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San Francisco, May 6, 1893.

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Hydraulic Mining Laws and Decisions.

Considerable space is devoted in the MINING AND SCIENTIFIC PRESS of this week to the laws relating to the hydraulic mining industry in California. We give in full the new United States law, best known as the Caminetti Act, the new amendment to the California code, and the new law creating a California State Debris Commission. There is also published in full the last decision of the U. S. Circuit Court in the North Bloomfield case, in which that mine, having shown that it has successful restraining works, is permitted to continue to mine.

It will repay any one interested in a hydraulic mine in California to read carefully this number of the PRESS and then file it away for reference, since whatever legal questions come up in the operation of such mines, these acts and decisions will be found to have some bearing. Hydraulic mines worked in this State, hereafter, will do so under the Caminetti law, the penalty clause in which went into full operation on Monday of this week.

Whatever difference of opinion there may be as to the result of this law on the hydraulic mining industry, it certainly legalizes it. There are conditions and restrictions it is true, but these conditions and restrictions being complied with the miner can work without reference to the opinions of the local courts, anti-debris associations, or so-called "watchmen." In other words there is a way to conduct the business legally, whereas before the passage of the law it could not be conducted at all without being subject to injunction and other troubles at the hands of the enemies of the industry. If a miner now hydraulics illegally he will be punished by fine and imprisonment; but if his enemies interfere with his restraining works they subject themselves to the same penalties.

There are doubtless certain mines upon which it will not pay to erect impounding works; but as these mines could not be legally worked before they are no worse off now than then. Moreover, the new law provides measures by which groups of mines in certain drainage basins may combine in joint restraining works, each paying its proportionate share.

With regard to the new law it may be said that the miners consider that there are too many restrictions and the anti-debris people think there are not enough. It is proper to state, however, that while the largest hydraulic mining companies in the State were opposed to the final passage of the law, some of them already see the error of their ways and think it will be a benefit in the long run. There is no doubt that had the Caminetti bill failed of passage, the whole industry would have had a set-back for another ten years. Moreover, the Legislature would not have passed the favorable laws it did, and these in themselves are of the highest importance. The California Code now recognizes hydraulic mining as a legal industry and defines it.

A History of the Miners' Movement.

In his inaugural address in 1891, Governor H. H. Markham called the attention of the Legislature to the hydraulic mines of California and suggested that the subject be thoroughly agitated, Congress be memorialized, and our Senators and Representatives urged to take all necessary steps to bring the subject properly before Congress at the earliest moment possible. He thought that the subject of the production of gold should be investigated by the Federal Government, just the same as that of irrigation was. A committee of Senators and Assemblymen waited on the Governor and thanked him for his action. During the session of the Legislature a joint resolution was passed asking Congress to appoint a Commission to come to California to examine our rivers and hydraulic mines and take such action as would enable the hydraulic mines to resume operations.

In the meantime the Commission appointed by the Act of Congress in 1888 filed its report with the Secretary of War. This was the report of Lieut. Col. A. Benyuard and Major Hanbury and Major Heuer, from which we have frequently quoted. It recommended the construction of impounding dams for the debris.

In the latter part of 1891, Thomas B. Everett, a miner of Auburn, Placer county, suggested to Mr. Filcher of the Placer Herald the feasibility of calling a convention of the miners of the county to see if they could not take steps to have the hydraulic mines resume work. A call was issued and a number of miners responded. This Placer county convention issued a call for a State Mining Convention, and published an address to the people of California, setting forth the condition of the hydraulic mining industry and asking for assistance and relief. The editor of the MINING AND SCIENTIFIC PRESS happened to be the only San Francisco representative at that convention, and to him was therefore entrusted the preliminary work of interesting San Francisco people in the matter. On his return to the city a meeting was called and 16 gentlemen met and discussed ways and means for organizing. Committees were appointed to arrange for the State Convention, and many people then became interested.

In January, 1892, the State Mining Convention was held, and representatives from all the counties of the State were present. It was the most fully attended convention ever held in this city, and great enthusiasm was manifested. There was a somewhat unexpected reconciliation brought about between the mountain and valley representatives. The miners expressed themselves as willing to abide by the laws and to impound their debris in the future, on understanding which the valley men present were willing to withdraw opposition, it being agreed that Congress was to settle the question between the two factions. A memorial and resolutions were adopted and forwarded to Congress, asking relief on the basis of the report of the U. S. engineers.

A State Miners' Association was then organized, and branch associations formed in the different counties interested. The miners' appeal to Congress was backed up by suitable resolutions of the San Francisco City and County Supervisors, Chamber of Commerce, Board of Trade, and similar organizations, those of Alameda county, and the supervisors of the mining counties. The public press spoke favorably of the resumption of hydraulic mining and sympathy for the miners' cause was everywhere apparent and has since continued.

There was a long and expensive struggle before Congress to get the necessary laws. The Caminetti bill while pending was made the subject of heated discussion, and it was evident that old prejudices had not disappeared and that there were still fanatics on both sides of the controversy. The bill after having suffered many amendments, was, however, finally passed, but in such a shape as to be somewhat unsatisfactory to the two contending factions. Then the State Legislature, which had previously passed a resolution asking Congress to pass the bill, enacted a State law in accord with the Congressional law.

This in brief is a history of the movement which finally resulted in the enactment of the Caminetti and the Ford laws. During this period came a favorable decision from the United States Circuit Court denying an injunction on the North Bloomfield mine. It was in the case of this same mine that the Sawyer decision was given which closed the hydraulic mines of the State. The new decision permitted the mine to continue operations, it having been shown that suitable impounding works had been built and were in operation.

It now remains to be seen whether in the practical working of the new law, the mines could be profitably worked or not. The miners are not entirely agreed on this, but time will soon show. At all events the hydraulic mining business has been placed on a basis which is recognized by National and State laws under the conditions specified in the several acts.

Keeping Pledges.

The anti-debris people having had a good deal to say about the miners having broken faith with the farmers, because a few men hydraulicked contrary to the request of the Miners' Association, it may be as well to say that the miners kept their pledges best. They have only asked to be permitted to mine under the conditions suggested by the U. S. Engineers, and have made no attempt to evade the issue of the impounding dams. But the other side to the controversy, have, in a measure, repudiated their original compromise by denying that any was ever made on their part.

For instance, at the River Improvement Convention in January, 1892, a conference was authorized between the committees of that convention and the Miners' Convention. This conference was to harmonize the interests of the miners and the valley people. It was resolved to aid and assist each other before Congress, in order to have unity of action, and both committees were to use their best efforts to secure favorable legislation for each appropriation for the rivers and creeks and for the plans recommended by the engineers for the resumption of hydraulic mining.

This was all agreed to, and both delegations went on to Washington. When the bill for the improvement of the rivers in California came before the River and Harbor Committee, Judge Searles, who was there in the interest of the miners, made an argument on behalf of the river men. The miners' delegation gave every assistance, and through their efforts the appropriation for California rivers was increased by \$150,000. Just after this action, in May, a mass meeting of farmers and citizens was held in Colusa, protesting against the passage of any hydraulic mining law by Congress tending in any way toward the resumption of the industry. Then, on June 10th, there was a valley county convention held in Sacramento, at which the committee appointed by the Miners' Association was not treated very nicely, and there was so much doubt about admitting them at all, that they left for home before a decision was reached. The valley convention adopted resolutions, among which was the following:

"Inasmuch as it has been stated that the people of the valley favor, or have no objection to, the erection of dams in the navigable rivers of California, or their tributaries, for the purpose of permitting the resumption of hydraulic mining, and in the belief that they will be effectual for that purpose, we solemnly declare that such dams will not restrain the debris that has done so much damage in the past, and we are unalterably opposed to the erection of dams for the further prosecution of hydraulic mining. We deny that the engineers of the United States have reported that the erection of dams will restrain the matter that has injured the rivers, and as proof of this assertion we quote their own language, viz.:

"These dams, however, will not be effective in impounding all of the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams, to eventually find lodgement in the river below. The finer sands and clay cannot be effectually impounded by such barriers, but will be carried off in suspension."

This last paragraph from the engineers' report had been many times persistently misquoted by professional anti-debris agitators, and was again misquoted in this instance. The exact language of the paragraph in the official report issued by Congress, is as follows:

"These dams, however, will not be effective in impounding all of the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams to eventually find lodgement in the river below. The finer sands and clay cannot be effectually impounded by such barriers, but will be carried off in suspension. With the improved condition which it is desired to give to the navigable rivers it is probable that the greater part of this fine material can be carried off without being productive of harm."

The italics to the concluding sentence are ours. It will be seen that the favorable conclusion of the engineers was suppressed by the farmers of these resolutions, as it had been suppressed in every instance of the kind previously. Now, this is not fair fighting. Explicitly stating that they quote the language of the engineers, and then omitting the conclusion of the paragraph because it is unfavorable to their side, or does not express the opinion they want, is manifestly unjust to the miners, and to their own people as well.

It is worthy of note that those gentlemen present who had attended the Miners' Convention in this city, and had heard both sides of the question, were much more liberal in their ideas than those who had looked at the matter entirely from the anti-debris point of view.

The Sacramento Bee, a strong anti-debris paper, was obliged to confess in this connection "that the action of the Sacramento convention will look to the public more like an attack on hydraulic mining itself than a protest against that portion of it which will inflict damage on the valley and rivers. It savors enough of unfairness in spirit to cause an open rupture with the great majority of the Miners' Association, who have unquestionably acted in good faith in discontinuing mining and in restraining, to the extent of their ability, their less honest colleagues."

The same set of men continued to oppose the Caminetti bill in Congress. When the Debris Commission bill came

up before the Legislature they opposed that. The Ford Hydraulic Mining bill was violently opposed also. The attorney for the Anti-Debris Association said that the quartz and drift miners should be careful in lending their support to the hydraulic miners, because if they continued to do so they might also be enjoined where their tailings entered streams. Mr. Durst of Yuba endeavored to kill the Ford bill by including the quartz, placer and drift mines with the hydraulic claims, in an amendment, which was beaten by a vote of 50 to 16. Both these Ford bills were passed, notwithstanding the protest of the anti-debris men, and they then petitioned the Governor to veto them. He signed both bills, however. The California delegation to the Trans-Mississippi Congress agreed on suitable resolutions favorable to hydraulic mining, but again the anti-debris men objected. They even filed a protest before the Congress in opposition to the recommendation of this delegation. These men went from Yuba, Sutter, Yolo and Colusa counties expressly to defeat the miners, but were themselves defeated. The Congress passed the resolutions.

By and by these men will discover that public opinion has changed on this subject. Congress, the State and public bodies on all sides favor the resumption of hydraulic mining under the proposed conditions, and it will be resumed despite the efforts of the anti-debris clique. But what we have written proves that if pledges or promises have been broken, it has been on the part of the opponents of the miners.

The State Miners' Association.

Until the miners of this State organized as a body, nothing was accomplished in their interest. The hydraulic miners had been making individual contests against the powerful Anti-Debris Association, and had been beaten at every turn. There was no unity of action. The old Miners' Association, which undertook the first fight, was not at all like the new one, since it was subject mainly to the will of an individual who managed it, and those who contributed had little or nothing to say. The present State Miners' Association has in its Executive Committee a vice-president and a representative from each mining county, and, in the conventions, the votes are in proportion to the number of members of the respective County Associations. In this way, every county and every association is duly represented.

Since the State Miners' Association was organized, its influence has been very great. One branch alone has 1500 members and another 1200. Altogether, there are some 6000 members. These are not only hydraulic miners, but those working in drift, quartz and other branches of the industry. It is due to the State Association that so much has been accomplished in various directions. The favorable and helpful action of County Supervisors, Boards of Trade, Chambers of Commerce and other bodies, is due to their efforts. The State Legislature, the Mining Congress and the Trans-Mississippi Congress have all adopted resolutions and memorials favorable to the hydraulic-mining interests of California, a result brought about by the work of the State Miners' Association.

It was the influence of this body which finally obtained the enactment of the Congressional and State laws now in force. Not all that was desired was obtained, but sufficient to rehabilitate the hydraulic mining industry, before absolutely stagnant. Some criticism has been made on the amount of money expended by the delegation sent to Washington by the association; but all with any experience at the National Capital know that delegations with buttoned pockets obtain little or nothing. It is necessary to entertain and not be niggardly in expenditure. This was perfectly understood when the delegation was sent, and the members were as careful in expenditures as the circumstances warranted.

It must be remembered that every step taken and every move made was in the face of vigorous opposition. There was no clear way in front of the association. There was always a measurement of forces against the Anti-Debris Association, organized and ready to oppose nearly everything the miners desired. That association had practically had its own way for some years and naturally resented any interference. The miners being now organized, however, were in a position to have something to say also.

Every move has been carefully considered by the executive committee of the Miners' Association. They had to be prepared to meet opposition at any time, and have always been ready. It has been necessary to keep their proceedings to themselves, but they have been successful before the legislative committees, the legislature, Congress, the Trans-Mississippi Congress, and elsewhere. The miners must continue to keep up their county associations, and thereby their State Association, unless they want to see those opposed to them again get the upper hand. The Miners' Association's work is by no means done. They

have still to work on the U. S. mining laws for the benefit of the quartz, drift and petroleum interests. The association has an active and energetic president and secretary, and an attentive executive committee. It will continue, however, to need the active support of the companies and miners of California to be of benefit to the mining industry of the State.

The Miners Not Lawless.

Though an avowed advocate of the interests of the hydraulic miner in California, the MINING AND SCIENTIFIC PRESS has never had the slightest sympathy with those few men who have defied the laws and continued work against the express injunction of the courts. These men have done the industry immeasurable harm in more ways than one, and greatly hindered and delayed a solution of the problem. Especially during the past two years has their work been detrimental to all except their own personal interests. The Caminetti bill would have been much milder in its provisions had there not been persistent law-breaking on the part of a few miners. The State Miners' Association which had charge of the fight for the resumption of hydraulic mining, issued an earnest appeal to all miners to obey the laws and cease illegal hydraulicking. They had no means of enforcing this request and, while most miners complied, some others did not, and these few made it an uphill fight for the rest. If such men are now detected, fined and imprisoned, they deserve no sympathy whatever. They were really traitors to their own cause.

We understand very well that there was strong provocation in many instances; that men badly needed money and had nothing else to depend on; that they understood richer miners were paying for the privilege of mining and they could not; that they were being prosecuted by strong-handed enemies who showed no mercy; that they thought the decisions stopping them were illegal and unjust; that they had bought their claims in good faith from a Government which took their money and then refused to let them work the ground; that they had worked in this way long before the farms below were cultivated; these and many other reasons were advanced as palliation of their acts. But other men had the same reasons, yet obeyed the mandates of the courts, and while all were fighting in a common cause, it was a great drawback to carry even the small number of men who were breaking one law while asking for another.

Many people with only a superficial knowledge of this subject imagine the hydraulic miners to be a lawless set of men engaged in a business detrimental to the best interests of the State; and this opinion has been brought about by the acts of a few men who have been held up as examples of all. The quiet, law-abiding miners, far in the majority, have not been heard of in the discussion to any extent. Miners away off in Plumas and Sierra counties have been temporarily enjoined which could in no way damage any navigable river; and the temporary injunctions have been practically permanent because it was useless to contest.

The fact is, however, that a great majority of hydraulic miners of California have obeyed the laws. It must be remembered that there has never been a law against hydraulic mining, nothing but the decrees of the courts. There has been no statutory provision. The injunctions of the courts destroyed property worth upward of one hundred million dollars. Spies roamed up and down the mining region for seven or eight years and this only resulted in about sixteen charges of disobeying the laws, some of which were not proven. The miners as a class have, therefore, shown truer and better adherence to the laws than any other class of men under such trying circumstances ever showed. It is admitted that a few of them have violated the injunctions, but they should not be taken as a type of all.

THE Caminetti law, with its penalties, went into effect this week, and as it is a measure of the greatest importance to the gold-mining interests of California, we have devoted most of our space to this and kindred subjects. For this reason we are unable to present any account of the opening of the World's Fair at Chicago. We shall have plenty of opportunity to present to our readers such matters as may interest them connected with the World's Fair.

J. K. LUTTRELL, who was one of the State Miners' Association delegates to Washington to urge hydraulic-mining legislation, has been appointed U. S. Commissioner for Alaska, at a salary of \$4500 per annum.

THE conclusion of the negotiations between the Idaho and Maryland mines, Grass Valley, is an important transaction for that town. The subject is referred to at length in our Mining Summary.

RED gold and copper discoveries are reported in the Eagle Tail mountains, 90 miles west of Phoenix, A. T.

The Trans-Mississippi Congress Favors Hydraulic Mining.

Before the San Francisco delegation left here for Ogden it was agreed by vote to present resolutions asking Congress to appropriate money to build restraining dams for mining debris now in the California rivers. There was, of course, some opposition to the measure, but the vote was overwhelmingly favorable and the proposed resolutions were agreed to. On the train on the way to Ogden the whole California delegation considered these and the other resolutions. The representatives from Colusa, Yolo, Yuba and Sutter counties, voted "no" on the hydraulic mining resolutions, on the ground—according to Mr. George Ohleyer—that hydraulic mining could not be rendered harmless by the construction of dams, and because they declined most emphatically to be committed to the impounding "theory," or to the assertions of the majority of the delegation in relation thereto. The particular representatives from the counties mentioned entered a formal written protest against the adoption of the resolutions referred to. None of this did them any good, however, for among the resolutions adopted by the Congress were the following:

WHEREAS, By the action of the State and United States Courts in the State of California in enjoining hydraulic mining, the gold product of that State has been reduced millions of dollars a year, for the last ten years and,

Whereas, the output of gold is a matter of material importance, not merely to the State of California, but to the finance and treasury of the United States; and,

Whereas, the Congress of the United States at its last session passed a law (commonly known as the Caminetti bill) which provides for the construction, under a board of engineers appointed by the President of the United States, of dams to impound mining debris, by means of which dams, when constructed, the navigable streams of the State of California will be protected from the injuries which would otherwise necessarily result to the navigability of said streams, and which dams would also enable hydraulic mining to be revived without injury to the navigable streams, and vastly add to the gold products of the United States; and,

Whereas, the gold-mining industry of California is now in such a condition that the owners of the mines in large number are not financially able to bear the expense of the construction of such dams, and the State of California has appropriated \$250,000 to aid in the construction of such dams whenever the United States Government shall have made an appropriation for that purpose not less than said sum;

Resolved, By the Trans-Mississippi Congress, in convention assembled, that a great and commanding need of the State of California is liberal treatment of its navigable waters and harbors by the Federal Government, and we earnestly request our representatives in Congress to use all honorable means to secure appropriations adequate to the requirements.

Resolved, That we urge upon Congress the importance of enacting into law the bill recently introduced into Congress by Hon. A. Caminetti, of California, providing for the placing of the Sacramento and San Joaquin rivers under the contract and special commission system.

Resolved, That we urge upon Congress the great importance of making an appropriation of \$450,000 to be used in connection with the \$250,000 appropriated by the State of California, in carrying out the provisions of the Caminetti Hydraulic Mining Law, in the interest of the navigable streams and hydraulic mining recently passed by Congress, in the impounding of debris as provided in such law, is of vital interest and essential to the restoration and preservation of said rivers and harbors, not only as regards debris resulting from future hydraulic mining, under the provisions of said law, but also such debris as now lies in canyons and streams tributary to and destined to be carried into their channels if not restrained.

The U. S. Debris Commissioners Appointed.

On Thursday the President appointed as members of the U. S. Debris Commission Lieut. Colonel George H. Mendell, Colonel Wm. H. H. Benysard and Major William H. Heuer. These are the Commissioners under the Caminetti law, "An Act to create the California Debris Commission and regulate hydraulic mining in the State of California." The Secretary of War, upon request, selected these gentlemen two months ago, but it was not until this week that they were appointed.

After official notice of their appointment, they have 30 days in which to organize. It is to this Commission that hydraulic miners must apply for license to mine. They are all residents of San Francisco, and all well posted on the debris question and the rivers and harbors in California. It is not probable that they will be ready to issue miners' licenses for some time, as they will doubtless wish first to agree on some general plans.

HYDRAULIC MINERS in this State should remember that the San Francisco Board of Trade, composed of business men of this city, contributed more money to their cause than any other organization—three times as much as the largest hydraulic mining company in California. They felt that a resumption of hydraulic mining would be good for the business interests of San Francisco, and the miners can now reciprocate by trading and buying supplies here as much as possible.

THE quicksilver "mine" in this city is still a prospect and there is now talk of a 60-foot shaft to prove the value of the deposit. So far it is only about 18 feet deep.

THE eight-hour bill for miners in Great Britain has passed to a second reading.

Coast Industrial Notes.

THE artesian well being sunk by George W. Durbrow on the desert at Indio commenced to flow last week with evident promise of a large supply of water.

THE government dredger has been taken up to Petaluma creek, where it has about four months' work to do. The McNear dredger is also at work on the McNear canal and basin.

JOHN GRIFFIN of this city, has gone to Astoria to find out what he can do about the sardine run on the Columbia river. He is doing this in the interests of a powerful company, which operates a factory at Astoria and packs large quantities of sardines annually. The plant which the company intends to put in, should the expert's report be favorable, will cost \$360,000.

J. H. SMITH of Portland, Or., who was awarded the contract at \$1,380,000 for constructing the Sunset canal, Fresno county, has sublet two portions of the work. One of these contracts was for machinery and was awarded to the Stillwell, Bierce and Smith-Vaile Company of Dayton, O., at \$100,000. The other contract was for pipe lines and amounts to about \$500,000.

At the last meeting of the Healdsburg city trustees, the California Gaslight and Fuel Company of San Francisco was granted a franchise to supply gas and fuel for light to Healdsburg and its inhabitants. This company will either purchase the old plant of the Healdsburg Gaslight and Fuel Company and reform it so as to use the Avery system, or will put in an entirely new Avery plant.

THE Whitney Transfer Company and G. P. McNear have completed the final arrangements for putting their proposed ferry system in operation on the 15th inst. Davie's wharf, between Webster and Harrison streets, has been leased, and the company's steamer, the Whitney Transfer, is now ready for duty, having undergone a thorough overhauling. The Harbor Commissioners will set aside a landing for the line on the San Francisco side.

THE Del Norte Record says that the "bull donkey" for use in one of Hobbs, Wall & Co's logging camps is now ready for work. The machine was built in San Francisco, but is a Humboldt production. One has been in use quite a time and works satisfactorily. It does away with oxen and horses in hauling logs to landings. Most of the Humboldt logging camps have employed oxen, and in stormy weather it was difficult to do work to advantage. The Pacific Lumber Company employed horses, which was faster than ox teams, but this machine will revolutionize all that.

IT IS ESTIMATED that there are now in the Columbia river, from all the salmon canneries, 1271 boats. From the opening of the season to to-day 52,310 salmon have been caught, which is equal to 17,500 cases. Contrasting the April pack with that of last year for the same month, these figures show that the canneries are 200 cases ahead of last season. In fact the pack up to the present time has been in every way an improvement on previous years. Owing to the prolonged cold and stormy weather the fish is harder and far more solid than is usual, and altogether the grade of salmon is very high. On account of the 5 cents per pound rule, the cannerymen are quoting higher rates to brokers and agents, and prices seem to be ruling strong and high.

FRANK F. CORRELL, of Modesto, has filed notice of location of 500,000 inches of water measured under a four-inch pressure on the San Joaquin river, the water to be utilized for the irrigation of desert lands in Stanislaus, Contra Costa and Alameda counties for domestic purposes and for power purposes for manufacturing in the said counties. The locator says that he intends to divert the water at a point at or near the line of sections 26 and 27, township 4 south, range 7 east, "near Grayson," and carry it in a main trunk canal for the purpose of distribution, said canal to be fifty feet in width at the bottom. Also to distribute the water by means of lateral canals, flumes, pipes, etc. The canal is to take a westerly course, following the contour of the land to the mouth of the San Joaquin river near Antioch.

OAKLAND is promised an abundant supply of pure water from the Alvarado artesian wells before the close of the year. W. J. Dingee, who is at the head of the enterprise, has employed Engineer Boardman, and the first work will be the construction of a circular reservoir 60 feet in diameter and 15 feet in depth, near the old steamer landing. Within a radius of 300 yards of the point there are now four flowing wells, which, tapped ten feet below the surface, will supply more than enough water, according to the engineer's estimates, than the city needs. The main from Alvarado to Oakland will be 30 inches in diameter, with a capacity of supplying 7,000,000 gallons every twenty-four hours, a quantity double the present water consumption of the city. The length of the main will be eighteen or twenty miles and the pumping will be done by a 500-horse-power engine.

THE steamer St. Paul, chartered by the North American Navigation Co., took away a large amount of freight which is to go to New York by way of the Isthmus. On deck 11,000 feet of selected redwood lumber was piled to a level with the deckhouse. The lumber is for cabinet-workers in New York to use. The shipments of high explosives include 400 cases of dynamite and 400 cases of giant powder for San Jose de Guatemala, 20 cases of dynamite for La Libertad, San Salvador, and 400 cases of dynamite for Amapala, Honduras. The remaining cargo is of a miscellaneous nature. There are 500 barrels of cement and 500 cases of coal oil for San Jose de Guatemala; hardware, oil, paints, canned goods, rice and corn for Champerico; corn and stationery for Acajutla; pampas plumes for Germany; 15,648 pearl shells for Eoglaod; wine for France; 600 flasks of quicksilver, valued at \$25,000, for New York; besides 465,510 pounds of borax, 8350 gallons California wine and 950 gallons of brandy. The cargo is a very valuable one for the size.

The Caminetti Law.

An Act to Create the California Debris Commission and Regulate Hydraulic Mining in the State of California.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a commission is hereby created, to be known as the California Debris Commission, consisting of three members. The President of the United States shall, by and with the advice and consent of the Senate, appoint the commission from officers of the Corps of Engineers, United States Army. Vacancies occurring therein shall be filled in like manner. It shall have the authority, and exercise the powers hereinafter set forth, under the supervision of the Chief of Engineers and direction of the Secretary of War.

SEC. 2. That said commission shall organize within thirty days after its appointment by the selection of such officers as may be required in the performance of its duties, the same to be selected from the members thereof. The members of said commission shall receive no greater compensation than is now allowed by law to each, respectively, as an officer of said Corps of Engineers. It shall also adopt rules and regulations, not inconsistent with law, to govern its deliberations and prescribe the method of procedure under the provisions of this Act.

SEC. 3. That the jurisdiction of said commission, in so far as the same affects mining carried on by the hydraulic process, shall extend to all such mining in the territory drained by the Sacramento and San Joaquin river systems in the State of California. Hydraulic mining, as defined in Section eight hereof, directly or indirectly injuring the navigability of said river systems, carried on in said territory other than as permitted under the provisions of this Act, is hereby prohibited and declared unlawful.

SEC. 4. That it shall be the duty of said commission to mature and adopt such plan or plans, from examinations and surveys already made and from such additional examinations and surveys as it may deem necessary, as will improve the navigability of all the rivers comprising said systems, deepen their channels and protect their banks. Such plan or plans shall be matured with a view of making the same effective against the encroachment of and damage from debris resulting from mining operations, natural erosion, or other causes, with a view of restoring, as near as practicable and the necessities of commerce and navigation demand, the navigability of said rivers to the condition existing in eighteen hundred and sixty, and permitting mining by the hydraulic process, as the term is understood in said State, to be carried on, provided the same can be accomplished without injury to the navigability of said rivers or the lands adjacent thereto.

SEC. 5. That it shall further examine, survey and determine the utility and practicability, for the purposes hereinafter indicated, of storage sites in the tributaries of said rivers and in the respective branches of said tributaries, or in the plains, basins, sloughs and tule and swamp lands adjacent to or along the course of said rivers, for the storage of debris or water or as settling reservoirs, with the object of using the same by either or all of these methods to aid in the improvement and protection of said navigable rivers by preventing deposits therein of debris resulting from mining operations, natural erosion or other causes, or for affording relief thereto in flood-time and providing sufficient water to maintain scouring force therein in the summer season; and in connection therewith to investigate such hydraulic and other mines as are now or may have been worked by methods intended to restrain the debris and material moved in operating such mines by impounding dams, settling reservoirs, or otherwise, and in general to make such study of and researches in the hydraulic mining industry as science, experience and engineering skill may suggest as practicable and useful in devising a method or methods whereby such mining may be carried on as aforesaid.

SEC. 6. That the said commission shall from time to time note the conditions of the navigable channels of said river systems, by cross-section surveys or otherwise, in order to ascertain the effect therein of such hydraulic mining operations as may be permitted by its orders and such as is caused by erosion, natural or otherwise.

SEC. 7. That said commission shall submit to the Chief of Engineers, for the information of the Secretary of War, on or before the fifteenth day of November of each year, a report of its labors and transactions, with plans for the construction, completion and preservation of the public works outlined in this Act, together with estimates of the cost thereof, stating what amounts can be profitably expended thereon each year. The Secretary of War shall thereupon submit same to Congress on or before the meeting thereof.

SEC. 8. That for the purposes of this Act "hydraulic mining" and "mining by the hydraulic process," are hereby declared to have the meaning and application given to said terms in said State.

SEC. 9. That the individual proprietor or proprietors, or in case of a corporation its manager or agent appointed for that purpose, owning mining ground in the territory in the State of California mentioned in section three hereof, which it is desired to work by the hydraulic process, must file with said commission a verified petition, setting forth such facts as will comply with law and rules prescribed by said commission.

SEC. 10. That said petition shall be accompanied by an instrument duly executed and acknowledged, as required by the law of the said State, whereby the owner or owners of such mine or mines surrender to the United States the right and privilege to regulate by law, as provided in this act, or any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the working of said mine or mines shall be restrained, and what amount shall be produced therefrom; it being understood that the surrender aforesaid shall not be construed as in any way affecting the right of such owner or owners to operate said mine or mines by any other process or method now in use in said State: *Provided*, That they shall not interfere with the navigability of the aforesaid rivers.

SEC. 11. That the owners of several mining claims situated so as to require a common dumping ground or dam or other restraining works for the debris issuing therefrom in one or more sites may file a joint petition setting forth such facts in addition to the requirements of section nine hereof; and where the owner of a hydraulic mine or owners of several such mines have and use common dumping sites for impounding debris or as settling reservoirs, which sites are located below the mine of an applicant not entitled to use same, such fact shall also be stated in said petition. Thereupon the same proceedings shall be had as provided for herein.

SEC. 12. A notice specifying briefly the contents of said petition and fixing a time previous to which all proofs are to be submitted shall be published by said commission in some newspaper or newspapers of general circulation in the communities interested in the matter set forth therein. If published in a daily paper, such publication shall continue for at least ten days; if in a weekly paper, in at least three issues of the same. Pending publication thereof said commission, or a committee thereof, shall examine the mine and premises described in such petition. On or before the time so fixed all parties interested, either as petitioners or contestants, whether miners or agriculturists, may file affidavits, plans and maps in support of their respective claims. Further hearings, upon notice to all parties of record, may be granted by the commission when necessary.

SEC. 13. That in case a majority of the members of said commission, within thirty days after the time so fixed, concur in a decision in favor of the petitioner or petitioners, the said commission shall thereupon make an order directing the methods and specifying in detail the manner in which operations shall proceed in such mine or mines; what restraining or impounding works, if facilities therefor can be found, shall be built, and maintained; how and of what material; where to be located; and in general set forth such further requirements and safeguards as will protect the public interests and prevent injury to the said navigable rivers, and the lands adjacent thereto; with such further conditions and limitations as will observe all the provisions of this act in relation to the working thereof and the pay-

ment of taxes on the gross proceeds of the same: *Provided*, That all expense incurred in complying with said order shall be borne by the owner or owners of such mine or mines.

SEC. 14. That such petitioner or petitioners must within a reasonable time present plans and specifications of all works required to be built in pursuance of said order for examination, correction and approval by said commission; and thereupon work may immediately commence thereon under the supervision of said commission or representative thereof attached thereto from said Corps of Engineers, who shall inspect same from time to time. Upon completion thereof, if found in every respect to meet the requirements of the said order and said approved plans and specifications, permission shall thereupon be granted to the owner or owners of such mine or mines to commence mining operations, subject to the conditions of said order and the provisions of this Act.

SEC. 15. That no permission granted to a mine owner or owners under this act shall take effect, so far as regards the working of a mine, until all impounding dams or other restraining works, if any are prescribed by the order granting such permission, have been completed and until the impounding dams or other restraining works or settling reservoirs provided by said commission have reached such a stage as, in the opinion of said commission, it is safe to use the same: *Provided, however*, That if said commission shall be of the opinion that the restraining and other works already constructed at the mine or mines shall be sufficient to protect the navigable rivers of said systems and the work of said commission, then the owner or owners of such mine or mines may be permitted to commence operations.

SEC. 16. That in case the joint petition referred to in section eleven hereof is granted, the commission shall fix the respective amounts to be paid by each owner of such mines toward providing and building necessary impounding dams or other restraining works. In the event of a petition being filed after the entry of such order, or in case the impounding dam or dams or other restraining works have already been constructed and accepted by said commission, the commission shall fix such amount as may be reasonable for the privilege of dumping therein, which amount shall be divided between the original owners of such impounding dams or other restraining works in proportion to the amount respectively paid by each party owning the same. The expense of maintaining and protecting such joint dam or works shall be divided among mine-owners using the same in such proportion as the commission shall determine. In all cases where it is practicable, restraining and impounding works are to be provided, constructed, and maintained by mine-owners near or below the mine or mines before reaching the main tributaries of said navigable waters.

SEC. 17. That at no time shall any more debris be permitted to be washed away from any hydraulic mine or mines situated on the tributaries of said rivers and the respective branches of each, worked under the provisions of this act, than can be impounded within the restraining works erected.

SEC. 18. That the said commission may at any time, when the condition of the navigable rivers or when the capacities of all impounding and settling facilities erected by mine-owners or such as may be provided by Government authority require same, modify the order granting the privilege to mine by the hydraulic mining process so as to reduce amount thereof to meet the capacities of the facilities then in use, or if actually required in order to protect the navigable rivers from damage, may revoke same until the further notice of the commission.

SEC. 19. That an intentional violation on the part of a mine owner or owners, company, or corporation, or the agents or employees of either, of the conditions of the order granted pursuant to section thirteen, or such modifications thereof as may have been made by said commission, shall work a forfeiture of the privileges thereby conferred, and upon notice being served by the order of said commission upon said owner or owners, company, or corporation, or agent in charge, work shall immediately cease. Said commission shall take necessary steps to enforce its orders in case of the failure, neglect or refusal of such owner or owners, company, or corporation, or agents thereof, to comply therewith, or in the event of any person or persons, company, or corporation working by said process in said territory contrary to law.

SEC. 20. That said commission, or a committee therefrom, or officer of said corps assigned to duty under its orders, shall, whenever deemed necessary, visit said territory and all mines operating under the provisions of this act. A report of such examination shall be placed on file.

SEC. 21. That the said commission is hereby granted the right to use any of the public lands of the United States, or any rock, stone, timber, trees, brush, or material thereon or therein, for any of the purposes of this act; that the Secretary of the Interior is hereby authorized and requested, after notice has been filed with the Commissioner of the General Land Office by said commission, setting forth what public lands are required by it under the authority of this section, that such land or lands shall be withdrawn from sale and entry under the laws of the United States.

SEC. 22. That any person or persons who willfully or maliciously injure, damage, or destroy, or attempt to injure, damage, or destroy, any dam or other work erected under the provisions of this act for restraining, impounding, or settling purposes, or for use in connection therewith, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not to exceed the sum of five thousand dollars or be imprisoned not to exceed five years, or by both such fine and imprisonment, in the discretion of the court. And any person or persons, company or corporation, their agents or employees, who shall mine by the hydraulic process directly or indirectly injuring the navigable waters of the United States, in violation of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five thousand dollars, or by imprisonment not exceeding one year, or by both such fine and imprisonment, in the discretion of the court: *Provided*, That this section shall take effect on the first day of May, eighteen hundred and ninety-three.

SEC. 23. That upon the construction by the said commission of dams or other works for the detention of debris from hydraulic mines and the issuing of the order provided for by this Act to any individual, company or corporation to work any mine or mines by hydraulic process, the individual, company or corporation operating thereunder working any mine or mines by hydraulic process, the debris from which flows into or is in whole or in part restrained by such dams or other works erected by said commission, shall pay a tax of three per centum on the gross proceeds of his, their or its mine so worked, which tax of three per centum shall be ascertained and paid in accordance with regulations to be adopted by the Secretary of the Treasury, and the Treasurer of the United States is hereby authorized to receive the same. All sums of money paid into the Treasury under this section shall be set apart and credited to a fund to be known as the "Debris Fund," and shall be expended by said commission under the supervision of the Chief of Engineers and direction of the Secretary of War, in addition to the appropriations made by law in the construction and maintenance of such restraining works and settling reservoirs as may be proper and necessary: *Provided*, That said commission is hereby authorized to receive and pay into the Treasury from the owner or owners of mines worked by the hydraulic process, to whom permission may have been granted so to work under the provisions hereof, such money advances as may be offered to aid in the construction of such impounding dams or other restraining works, or settling reservoirs, or sites therefor, as may be deemed necessary by said commission to protect the navigable channels of said river systems, on condition that all moneys so advanced shall be refunded as the said tax is paid into the said debris fund; *And provided further*, That in no event shall the Government of the United States be held liable to refund same except as directed by this section.

SEC. 24. That for the purpose of securing harmony of action and economy in expenditures in the work to be done by the United States and the State of California, respectively, the former in its plans for

the improvement and protection of the navigable streams and to prevent the depositing of mining debris or other materials within the same, and the latter in its plans authorized by law for the reclamation, drainage and protection of its lands, or relating to the working of hydraulic mines, the said commission is empowered to consult thereon with a commission of engineers of said State. If authorized by said State for said purpose, the result of such conference to be reported to the Chief of Engineers of the United States Army, and, if by him approved, shall be followed by said commission.

SEC. 25. That said commission, in order that such material as is now or may hereafter be lodged in the tributaries of the Sacramento and San Joaquin River systems resulting from mining operations, natural erosion or other causes, shall be prevented from injuring the said navigable rivers or such of the tributaries of either as may be navigable, and the land adjacent thereto, is hereby directed and empowered, when appropriations are made therefor by law, or sufficient money is deposited for that purpose in said debris fund, to build at such points above the head of navigation in said rivers and on the main tributaries thereof, or branches of such tributaries, or at any place adjacent to the same, which, in the judgment of said commission, will effect said object (the time to be of such material as will insure safety and permanency), such restraining or impounding dams and settling reservoirs, with such canals, locks or other works adapted and required to complete same. The recommendations contained in Executive Document Numbered Two hundred and sixty seven, Fifty-first Congress, second session, and Executive Document Numbered Ninety-eight, Forty-seventh Congress, first session, as far as they refer to impounding dams or other restraining works, are hereby adopted, and the same are directed to be made the basis of operations. The sum of fifteen thousand dollars is hereby appropriated, from moneys in the Treasury not otherwise appropriated, to be immediately available to defray the expenses of said commission.

Approved March 1, 1893.

Full Text of the North Bloomfield Decision.

The following is the complete decision of Judge Gilbert of the U. S. Circuit Court in the case of the United States vs. the North Bloomfield Gravel Mining Co., in favor of the North Bloomfield Gravel Mining Co., that its mining operations do not injure the navigable streams, and also modifying the injunction in the Woodruff case so as to allow it to mine by use of its impounding works. This decision has not before been published complete and is here given that hydraulic miners may understand its full scope:

In the Circuit Court of the United States in and for the Ninth Circuit, Northern District of California.

HON. WM. B. GILBERT, JUDGE.

UNITED STATES, Complainant,
vs.
THE NORTH BLOOMFIELD GRAVEL MINING CO., Defendant.
No. 7865.

WEDNESDAY, October 5, 1892.

Appearances.

A. L. RHODES, Solicitor for United States.
C. W. CROSS, Solicitor for North Bloomfield Gravel Mining Co.

Gilbert, J.—This is a suit for an injunction brought by the United States as complainant against the defendant corporation. The essential averments of the bill are that the Mining Company is engaged in hydraulic mining in Nevada county, and dumping its debris and tailings in such a way that the same flow into the South Yuba River, a tributary of the main Yuba River; thence into the main Yuba River; thence into the Feather River, and thence into the Sacramento. That the Yuba River is navigable from Marysville to its mouth, and Feather River is navigable from the mouth of the Yuba to the Sacramento, and that the Sacramento is navigable from its mouth to the mouth of the Feather. That heretofore, extensive hydraulic mining had been carried on upon the western water-shed of the Sierra Nevada mountains, which had done great injury to the navigable streams referred to, and that the hydraulic mining, as conducted by the defendant, had done great injury to said navigable streams, and the continuation of it will further materially contribute to the injury complained of.

The answer of the defendant denies that it was dumping debris or tailings from its mining operations so that the same flowed into the said rivers; but it alleges that it has erected extensive impounding works by means of which it impounded upon its own lands, and within its own mines, all material likely to injure the navigation of said streams, and that it would continue to impound such mining material so long as it should continue its mining operations, and that the same would remain permanently impounded and restrained in such a manner as not to injure the navigation of such streams. A large amount of testimony was taken on behalf of the respective parties, and the case is now to be decided upon final hearing.

At the outset we are met with the objection that the Court has no jurisdiction of the case, and that there is no right of action in the United States to prosecute the same. This objection was not raised by plea or demurrer, or in the answer, but was first presented upon the final argument. It is claimed that this Court has no jurisdiction of the cause for the reason that at the time of the commencement of the suit, in June, 1888, no Act had been passed by the Congress of the United States by which the United States Government had asserted its constitutional right to assume jurisdiction of the navigable streams referred to in the bill.

There can be no question of the right of the defendant to raise this objection to the jurisdiction upon final hearing. It is not a question of personal privilege, which can be waived by answer or by going to trial upon the merits; it is a fundamental question that goes to the right of the Court to hear and determine the matters involved in the suit.

If the Court have not the inherent power to bear and determine the cause, the parties to the suit cannot, either by their failure or neglect to attack the jurisdiction, or by their expressed consent and desire to confer jurisdiction, authorize the Court to proceed. The judgment of the Court in such a case would be a nullity. Hence, it is not left to the parties alone to raise the question of the jurisdiction, but by statute it is made the duty of the Court itself to dismiss the cause upon its own motion whenever the want of jurisdiction shall appear.

Grace vs. Insurance Co., 109 U. S. 278.

Bors vs. Preston, 111 U. S. 252.

Mansfield vs. Swan, 111 U. S. 379.

In this case, however, if there exists a cause of suit in favor of the United States, this Court has, undoubtedly, jurisdiction of the subject matter of the same, so that the real question is not so much whether the Court has jurisdiction as it is whether the plaintiff has a cause of suit.

The subject of the constitutional right of Congress to regulate commerce between the States, and the legislation necessary to carry that right into effect, together with the respective jurisdiction of the State Legislatures and Courts over navigable streams within their borders, have been considered in several decisions of the Supreme Court, and therein the limits of the jurisdiction of the Federal Courts have been clearly defined.

It is necessary to refer to a few only of these cases.

In the case of *Gilman vs. Philadelphia*, 3 Wall. 713, the Supreme Court affirmed the decree of the Court below, dismissing a bill brought to prevent the erection of a permanent bridge over the Schuylkill River at Philadelphia, the Supreme Court holding that as the river was wholly within her limits, the State had not exceeded the

bounds of her authority, and that until the dormant power of the Constitution was awakened and made effective, by appropriate legislation, the reserve power of the State was plenary, and its exercise in good faith not the subject of review by the Court.

In the case of *Escanaba Co. vs. Chicago*, 127 U. S. 678, the Supreme Court held, in respect of the Chicago River and its tributaries, which are navigable and lie within the limits of the State of Illinois, that Congress, in the exercise of its power under the Commerce Clause of the Constitution, may exercise control over the same to the extent necessary to protect, preserve and improve free navigation; yet, until that body acts, the State has plenary power over bridges across them.

In the case of *Cardwell vs. American Bridge Co.*, the question arose whether the act admitting California into the Union and declaring "that all the navigable waters within the said State shall be 'common highways and forever free, as well to the inhabitants of 'said State as to the citizens of the United States, without any tax, 'impost or duty thereon,' Congress had adopted such legislation over the navigable streams as would confer jurisdiction upon the United States Courts in a suit between private parties. After mature and careful consideration the Court held:

"That the portion of the Statute declaring that the navigable 'waters should be 'common highways was to be construed together with 'the remainder of the statute, which declares that the same shall be 'without tax, impost or duty, and that the whole intent and purpose 'of the statute was to provide against the use of navigable streams 'by private parties to the exclusion of the public and the exaction 'of toll for the navigation, and that it did not restrict the power of the 'State to authorize the construction of bridges, whenever such construction would promote the convenience of the public.

To the same effect is the decision in *Hamilton vs. Vicksburg Railroad Co.*, 119 U. S. 280.

In *Willamette Iron Bridge Co. vs. Hatch*, 125 U. S. 1, the Supreme Court, in a decision rendered by Mr. Justice Bradley, affirmed the doctrine of the previous cases and proceeded further in the line of those decisions and held that:

"There must be a direct statute of the United States in order to 'bring within the scope of its laws, as administered by the Courts 'of law and equity, obstructions and nuisances in navigable streams 'within the States. Such obstructions and nuisances are offenses 'against the laws of the States within which the navigable waters 'lie, and may be indicted or prohibited as such; but they are not 'offenses against United States laws which do not exist; and none 'such exist except what are to be found on the statute book."

The general purport of these decisions is that no recourse can be had to the Federal Courts on the ground that a Federal question is involved, unless Congress has, in pursuance of the right to regulate commerce, proceeded to carry out its constitutional power by legislative enactment in such a way as to prescribe the limit and extent of the regulation attempted to be asserted. In the case before the Court, however, I hold that it is not necessary that there be an infringement of a law of Congress in order that this Court may proceed to bear and determine the cause. All that is necessary is that a right of suit shall exist in favor of the complainant. Have the United States the right to preserve and protect the navigability of these streams by this suit for an injunction? It may be true, as contended, that the injury complained of is not an offense against any statute of the United States. It is equally clear that it is not an offense against any unwritten law of the Government, for there is no common law of the United States. The acts complained of, however, are injurious to the navigability of the streams. Congress has the undisputed power to regulate commerce between the States, and consequently it has power to prevent obstructions to navigation in navigable streams. The State of California has not assumed by the enactment of any statute or by the grant of franchise, to permit these obstructions, or to regulate the same. At the time this suit was commenced the General Government could lawfully assume jurisdiction over the rivers referred to.

Prior to the commencement of this suit Congress appropriated certain moneys for the improvement of these and other rivers in California, and accompanying the appropriation enacted a statute providing as follows:

"The balance of said unexpended money not to be used until the 'Secretary of War be satisfied that hydraulic mining, hurtful to navigation, has ceased on said waters and their tributaries. If he be 'not so satisfied he is hereby instructed to institute such legal proceedings as may be necessary to prevent the washing, sluicing, 'dumping or discharging detritus, debris or slickens caused by or 'arising from hydraulic mining, into either of said rivers or any of 'its tributaries, etc., etc., and he is hereby instructed to use out of 'said sum as much as may be necessary for said purpose."

24 U. S. Stats. at Large, 326.

This statute, while it does not amount to legislation sufficient to confer jurisdiction upon this Court over a suit between private parties, is sufficient to authorize the commencement of this suit by the United States. If this suit were in the nature of a criminal prosecution, or were an action for damages for past injury to navigable streams, there would be good reason to say that no cause of action existed in favor of the United States, for the reason that the wrongful acts in respect of which the action was commenced were not, at the time they were committed, interdicted by any statute of the United States. But this suit is instituted solely to protect navigation by restraining and enjoining future injury. The past injuries are referred to in the bill only for the purpose of informing the Court of the nature of the evils complained of and the extent of the injury to be apprehended in the future.

The statute quoted amounts to a declaration that these obstructions to the navigability of streams, which at common law would amount to nuisance, must hereafter cease, and that to prevent their recurrence the Secretary of War is authorized to institute any legal proceeding that may be necessary for that purpose. Under the discretion vested in the Secretary of War, no remedy could be so simple, direct and adequate as this suit for an injunction.

But even if there were no express statutory authority for the commencement of this proceeding for an injunction, there is sufficient reason for holding that the United States would have the right, independent of the statute, on the ground that an injunction is a necessary preliminary step to protect the improvements to navigation, authorized and about to be made under the Act of Congress just referred to.

It was said, in *Willamette Iron Bridge Co. vs. Hatch*, supra, that the appropriation by Congress of money to be expended in improving the navigation of a navigable river was no assumption of police power over the river, but in the same decision it is declared that any interference with the operations, constructions or improvements made by the general Government would be an offense against the laws and authority of the United States.

In the case of the *United States vs. Mississippi and Rum River Boom Co.*, 3 Fed. 548, it was held that where Congress had assumed jurisdiction of a river in interest of commerce, by causing the erection of works to improve its navigability, an injunction would be granted by the Circuit Court, at the suit of the United States, to prevent threatened injury to the improvement.

In *United States vs. Duluth*, 1 Dillon, 459, decided by Mr. Justice Miller, it was held that the United States may bring an injunction bill in the proper Circuit Court to protect improvements then being made in navigable waters under the authority of Congress.

If the right thus to protect improvements to navigation already made, and improvements in the course of being made under appropriations by Congress for that purpose, is accorded to the United States, it is difficult to perceive why a similar right does not exist preparatory to and in contemplation of such improvements, to restrain acts the continuance of which would render the objects to be accomplished by the appropriation less effective or of no avail.

It remains to be considered whether, under the allegations of the bill and the evidence introduced on behalf of the respective parties, an injunction should issue as prayed for.

The operation of the mine of this defendant corporation was enjoined by a decree of this Court in 1884, in the suit of *Woodruff vs. North Bloomfield Mining Co.*, and that injunction still remains in

force. In the decree an intimation was made that if in the future the defendant corporation should show to the Court that it had constructed impounding reservoirs which would successfully impound its mining debris, the decree might be modified so as to permit the operation of the mine. The defendant, since that decree and before the commencement of this suit, had established and was using the system of impounding works referred to in its answer to the bill. The question of fact now to be determined is whether or not, with the use and operation of the impounding works, mining debris escapes from the defendant's mine into the navigable waters of the Yuba, the Feather or the Sacramento, so as to tend to impair or injure the navigability of those streams. It becomes necessary, therefore, to carefully consider the construction and operation of the impounding device. At the time of the injunction in 1884 the North Bloomfield Mining Company, by the use of its monitors and its system of placer mining, had made an excavation on its grounds, which was in length nearly a mile, in width from five hundred to one thousand feet, in depth varying from one hundred and fifty to four hundred feet. There was no considerable stream of water running through this excavation and there was no natural outlet in the same. The tailings and debris from the mine had been discharged through a shaft which was sunk through solid rock near the center of the excavation. This shaft was eighty feet in the perpendicular and connected with a tunnel cut also through the solid rock, a distance of nearly half a mile, and opening into Humboldt canyon, which lies considerably below the level of the excavation. The total cost of the tunnel and shaft were in the neighborhood of half a million dollars. The impounding works were constructed by utilizing the excavation, the shaft and the tunnel. The impounding area is divided by a dam into two impounding basins, each of about twenty acres in extent, which may be called the old and the new basins. The surface of the old basin lies at an altitude of about one hundred feet above that of the new. The mining operations are all carried on at the upper end of the excavation. The mining is done upon two levels or benches, one at an elevation of about one hundred feet above the other. The debris from the upper mining level is carried on that level to the old impounding basin. The debris from the lower mining level is intended to be impounded in the new basin. Near the lower end of the old basin an inclined shaft has been sunk to connect with the tunnel, and its use is to allow the escape of water after all material likely to injure navigation shall have been deposited in the basin. A similar outlet is made in the new impounding basin, and both these outlets are cribbed up from the bottom so that a thin sheet of water from the surface only can escape. The operation of the old reservoir has been tested and a considerable amount of debris has been deposited within it. The dam which separates the basins is constructed across the excavation and prevents the debris from running back from the old basin into the new basin and the lower levels of the mine. The operation of impounding has been conducted in the following manner: The debris from the mining on the upper bench, consisting of gravel, sand and comminuted clay, together with sufficient water to carry the same, has been conducted by a sluice, with a tolerably swift current, down to the upper edge of the old impounding reservoir, and there discharged into the pond or lake. It has been found that the heavy material is deposited first, the lighter sand and gravel are carried somewhat farther, and when the current strikes the body of water in the pond nearly all the remaining material carried by the water is deposited, forming a bench across the upper end of the depositing pool, which presents an almost perpendicular wall from the surface to the bottom. The water, on striking the pool, is diffused through it and its current apparently ceases. It has the effect to raise the water in the pool and to cause a constant outpour from its surface over the edges of the lower crib.

There are three objections urged against the operation of this impounding reservoir. First, that it does not successfully remove from the water the material which is carried in suspension, and that the water which escapes by the cribs takes with it material which becomes deposited in the lower streams and injuriously affects the navigability of the same. Second, that the dam across the excavation is not of durable material and is liable to break. Third, that the cribs are liable to break or decay, and the impounding material may thus escape into the streams below.

Upon the first of these objections the evidence, although voluminous, is not to any considerable extent conflicting. The water that escapes through the cribs is discolored with very fine particles of comminuted clay which are held in suspension. It is impossible that water that has once fairly come to rest in the pool, and has then been drawn off from the surface through the cribs, should carry with it any sand or anything other than the lightest material. The evidence goes to prove that the fine clay held in suspension in the water, and which causes its discoloration, is of specific gravity very little greater than water, and that it will remain in suspension so long as the water moves with the velocity of a mile in two hours.

The evidence further shows that this material is carried in a state of suspension through the Yuba, the Feather and the Sacramento rivers, and into the ocean. It does not appear that at any point on those streams the water comes to rest, or the clay which it carries is deposited in an appreciable quantity.

After taking into consideration all of the evidence, I am convinced that after the water which conducts the mining debris shall have once come to rest so as to deposit all the sand and heavier material that is carried in suspension, leaving only the light, filamentary particles of clay, which give it its color, no material will be subsequently deposited from it unless it is brought to rest, and so remains for a period longer than it has remained at rest in the impounding pool.

Second—Is there danger to be apprehended from insufficiency of the dam which separates the old from the new impounding basin? The dam is constructed of brush and small trees, carefully laid so that the butts form the outer wall. It is made by layers, as the root fills up and as the deposited debris requires it. The interstices between the layers of brush are filled in with the gravel, sand and clay deposited from the flume. The dam as it now stands presents a wall nearly one hundred feet high, which seems to be a compact solid mass of gravel, sand and clay, with the brush interwoven so as to hold in place. If there were great pressure upon this dam, if it were a dam across a torrential stream, if its breaking or carrying away would discharge into the streams below, the debris that has accumulated, it would appear to be clearly insufficient for the purpose intended, but the evidence together with a personal inspection of the dam convinces me that there is no great pressure upon the dam. The heavy material deposited has not only accumulated about the dam, but for a considerable distance below, and the mass appears to be now in the process of recementation and solidifying, which already, to a considerable extent, has restored it to the condition of the material in the surrounding hills. If this dam should break, it is difficult to see where injury could result, for the impounded material, if it moved at all, could only escape into the new impounding reservoir. It is plain that there is no danger from winter torrents. The mine is not in the bed of a mountain stream. The amount of water which naturally falls into this excavation is small, and even in a winter torrent it must either all escape by the cribs or simply accumulate, and form a lake within the walls of the excavation.

It remains to be considered whether there is danger to the navigability of the streams from the breaking, decaying or destruction of cribs. The cribs are built of logs, about a foot in diameter, notched at the corners and laid in log-cabin style, lined within with heavy planks, tightly nailed, and covered on the outside with planks in a similar manner, so that the opening within the clear is about three or four feet square. It is claimed by the defendant that this material will not decay so long as it is kept moist by the surrounding mass. I do not think that that contention is well established by the evidence. The cribs, in time, will decay, but they will last for many years, and they will doubtless considerably outlast the use of these pools for impounding reservoirs. After the pools shall have been filled up with mining debris, and these cribs shall no longer be the outlet of the water of the mine, I do not perceive any harm that can come from their decaying. By that time the impounded material must have become, to a large degree, compact and solidified, so that the caving in

of any considerable portion of it need not be expected; and if it should cave in, it is plain to my mind that the result would be simply to choke up the shaft and permanently close the same. This view is supported by the history of the use of the shaft heretofore. It is proven that the sudden discharge into the shaft and tunnel of a greater amount of debris than the water could carry away has resulted in a choking up of the outlet, and that the mass of material and water above has simply served, by their pressure, to increase the difficulty of removing the material and reopening the shaft. In short, the danger to be apprehended from the operation of the North Bloomfield mine, with its impounding reservoirs as constructed and used and intended to be used, is so remote and improbable that the Court is not justified in enjoining the use of the property and thereby interdicting a valuable industry.

In arriving at this conclusion, I am not unmindful of the great damage to navigation that has heretofore resulted from the deposit of mining debris, nor of the important interests that are involved, but I am convinced that in the case of this particular mine the contingency has arisen which was contemplated in the decision of this Court in the mining debris cases, in providing that the decree might thereafter be modified upon a showing to the Court that a plan to obviate the injuries had been successfully executed.

The injunction will be denied.

The California State Debris Commission.

An Act to Provide for the Appointment, Duties and Compensation of a Debris Commissioner, and to Make an Appropriation to Be Expended Under His Directions in the Discharge of His Duties as Such Commissioner.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Governor of the State of California shall, on or before the first day of January, eighteen hundred and ninety-four, appoint a competent civil engineer for a period of four years only, to be known as and called the Debris Commissioner.

SEC. 2. Said Commissioner shall, during the time he shall be actually employed in the discharge of his official duties, receive a compensation of three hundred dollars per month and his necessary traveling expenses, to be allowed by the State Board of Examiners.

SEC. 3. Whenever any Board of Engineers of the United States Government shall have been appointed, with power to adopt plans and specifications for the construction of works for the impounding of mining debris, it shall be the duty of said Debris Commissioner to consult and advise with such Board of Engineers of the United States Government, and to examine and pass upon the merits of such works, and said Debris Commissioner shall determine whether or not such works are calculated to and sufficient to protect the navigable waters of the State, and to keep a record of such determinations.

SEC. 4. There is hereby appropriated out of the General Fund of the treasury of this State not otherwise appropriated the sum of two hundred and fifty thousand dollars, no warrant against said sum to be drawn or paid until the United States Government shall have appropriated at least an equal amount, to be used in the construction of works for the restraining or impounding of mining debris in California, said moneys to be paid only upon orders drawn by the Controller, upon the written request of the said Debris Commissioner, and to be drawn only for the payment of not more than one-half of the cost of the construction of any such works for restraining and impounding mining debris as shall have been approved by him and duly adopted and recommended by Engineers of the United States Government appointed for that purpose.

SEC. 5. The term of office of said Debris Commissioner shall be four years from the date of his appointment. He shall take the same oath of office as is provided by law for other State officers, and before entering upon the discharge of his duties shall give bond with sufficient sureties, to be approved by the Governor of the State, in the sum of fifty thousand dollars, for the faithful discharge of his duties as such officer.

SEC. 6. The said Debris Commissioner shall have the power to appoint a Secretary, at a monthly salary to be fixed by said Commissioner, not exceeding one hundred and twenty-five dollars per month; said Secretary to hold office at the pleasure of the said Commissioner; provided, however, that no secretary shall be appointed until said Debris Commissioner shall enter upon the actual discharge of his duties.

[SEC. 7. All expenditures authorized by the provisions of this Act shall be subject to the approval of the State Board of Examiners; and the State Controller is hereby authorized to draw his warrant for all expenditures not in excess of the appropriation herein provided for, so approved by the State Board of Examiners, and the State Treasurer is hereby directed to pay the same.]

The Voorhies Mine Signal Law.

An Act to Establish a Uniform System of Mine Bell Signals, to be Used in All the Mines Operated in the State of California, and for the Protection of Miners.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every person, company, corporation or individual operating any mine within the State of California—gold, silver, copper, lead, coal, or any other metal or substance where it is necessary to use signals by means of bell or otherwise, for shafts, inclines, drifts, crosscuts, tunnels and underground workings—shall, after the passage of this bill, adopt, use and put in force the following system or code of mine bell signals, as follows:

- 1 bell, to hoist. (See Rule 2.)
 - 1 bell, to stop if in motion.
 - 2 bells, to lower. (See Rule 2.)
 - 3 bells, man to be hoisted; run slow. (See Rule 2.)
 - 4 bells, start pump if not running, or stop pump if running.
 - 1—3 bells, start or stop air compressor.
 - 5 bells, send down tools. (See Rule 4.)
 - 6 bells, send down timbers. (See Rule 4.)
 - 7 bells, accident; move bucket or cage by verbal orders only.
 - 1—4 bells, foreman wanted.
 - 2—1—1 bells, done hoisting until called.
 - 2—1—2 bells, done hoisting for the day.
 - 2—2—2 bells, change buckets from ore to water, or vice versa.
 - 3—2—1 bells, ready to shoot in the shaft. (See Rule 3.)
- Engineer's signal, that he is ready to hoist, is to raise the bucket or cage two feet and lower it again. (See Rule 3.)

Levels shall be designated and inserted in notice hereinafter mentioned. (See Rule 5.)

SEC. 2. For the purpose of enforcing and properly understanding the above code of signals, the following rules are hereby established:

RULE 1. In giving signals make strokes on bell at regular intervals. The bar (—) must take the same time as for one stroke of the bell, and no more. If timber, tools, the foreman, bucket or cage are wanted to stop at any level in the mine, signal, by number of strokes on the bell, the number of the level first before giving the signal for timber, tools, etc. Time between signals to be double bars (— —).

Examples:
6—5, would mean to stop at sixth level with tools.
4—1—1—1—1, would mean stop at fourth level, man on, hoist.

2—1—4, would mean stop at second level with foreman.

RULE 2. No person must get off or on the bucket or cage while the same is in motion. When men are to be hoisted, give the signal for men. Men must then get on bucket or cage, then give the signal

to hoist. Bell-cord must be in reach of man on the bucket or cage at stations.

RULE 3. After signal "Ready to shoot in shaft," engineer must give his signal when he is ready to hoist. Miners must then give the signal of "Men to be hoisted," then "spit fuse," get into the bucket, and give the signal to hoist.

RULE 4. All timbers, tools, etc., "longer than the depth of the bucket," to be hoisted or lowered, must be securely lashed at the upper end to the cable. Miners must know they will ride up or down the shaft without catching on rocks or timbers and be thrown out.

RULE 5. The foreman will see that one printed sheet of these signals and rules for each level and one for the engine-room are attached to a board not less than twelve inches wide by thirty-six inches long, and securely fasten the board up where signals can be easily read at the places above stated.

RULE 6. The above signals and rules must be obeyed. Any violation will be sufficient grounds for discharging the party or parties so doing. No person, company, corporation or individuals operating any mine within the State of California, shall be responsible for accidents that may happen to men disobeying the above rules and signals. Said notice and rules shall be signed by the person or superintendent having charge of the mine, who shall designate the name of the corporation or owner of the mine.

SEC. 3. Any person or company failing to carry out any of the provisions of this act shall be responsible for all damages arising to or incurred by any person working in said mine during the time of such failure.

SEC. 4. This act shall take effect immediately.

The Ford Hydraulic Mining Law.

At the last session, the State Legislature added the following two sections to the code:

SEC. 1424. The business of hydraulic mining may be carried on within the State of California wherever and whenever the same can be carried on without material injury to the navigable streams, or the lands adjacent thereto.

SEC. 1425. Hydraulic mining, within the meaning of this title, is mining by means of the application of water, under pressure through a nozzle against a natural bank.

This, as well as the Debris Commission bill was introduced in the Senate by Senator Tiev L. Ford, of Sierra, Plumas and Nevada counties and Mr. R. I. Thomas of Nevada county introduced them in the Assembly. In order that the miners of the State should have a clear understanding of the effect of these bills upon their industry the editor of the MINING AND SCIENTIFIC PRESS interviewed Senator Ford and his statements were given in the PRESS shortly after the bill passed. The interview is here republished, as it explains fully the effect of this and other recent hydraulic mining laws, which are also published in full in this number of the MINING AND SCIENTIFIC PRESS.

"What effect do you think the legislation during this session of the legislature, and especially these two laws of yours, Mr. Ford, will have on the hydraulic mining in this State?"

"Senate bill No. 150 defines the conditions under which hydraulic mining may be conducted. The purpose of this bill was to embody in our civil code the principle that had been established concerning the business of hydraulic mining by our State and Federal courts. As you will remember, the latest expression of judicial opinion on this subject was the decision of the U. S. Circuit Court in October last in the case of the United States against the North Bloomfield Mining Co. The U. S. Circuit Court in that case, after hearing the evidence and the argument, and a personal inspection of the premises by the justice of the court, decided that mining by the hydraulic process could be prosecuted by this company and refused to issue an injunction. The practical effect of that decision was to dissolve a former injunction that had been issued by Judge Sawyer. This former injunction was the result of the famous suit known as Woodruff vs. North Bloomfield Mining Co. This last-named suit is the one upon which is based the main reliance of the Anti-Debris Association, and in all their discussions they quote from Judge Sawyer's opinion in that case and make it the basis of their arguments. The decision of last October by the same court, in a case where the same company was defendant, without overruling the decision of Judge Sawyer, did lay down the rule that not only could hydraulic mining be carried on without material injury to navigable streams and adjacent lands, but that, in fact, one of the largest hydraulic mines in the State of California had actually constructed such restraining works as enabled this very result to be accomplished. The justice who rendered the opinion stated (and this opinion can be readily obtained) that although the water leaving the restraining works was discolored and contained fine particles of comminuted clay, it did not contain or carry any such material as would be deposited in a navigable stream or anywhere when carried by water traveling at the rate of a mile in two hours, and that such material as was carried in suspension in water leaving this mine would be carried through San Francisco Bay to the Pacific Ocean. Senate bill No. 60 contains the principle of this decision boiled down and crystallized into a code section."

"Was there anything in the code prior to this prohibiting hydraulic mining?"

"No, the codes, heretofore, have contained nothing with reference to hydraulic mining. The whole law concerning the business of hydraulic mining was embodied in numerous decisions of the State and Federal Courts, and our State being a Code State and it being the policy of our State to embody all well-known legal principles in our code, and the law governing hydraulic mining having at last become settled by the courts, it was deemed advisable to enact into a code section the principles thus established."

"It will be readily seen that this legislation is very conservative in character. It gives the miner no rights beyond those given him by the decision of the U. S. Circuit Court last October in the North Bloomfield case, but it does definitely determine the conditions that may be imposed upon the hydraulic miner, the rule of evidence that must govern in cases involving this industry, and puts the law into a definite and fixed form and in a code section where all may read and understand it. It places the business of hydraulic mining among the legitimate industries of our State, where it rightfully belongs and, it is hoped, will

tend to put an end to the controversies that have heretofore been detrimental to both mountain and valley interests.

"I might add here that the apparent fear of some of the valley people that this provision may encourage the illegal prosecution of hydraulic mining is wholly without any reasonable foundation. The very law itself prohibits, in effect, any hydraulic mining except such as can be carried on in compliance with its terms, and, as every lawyer in the State of California knows, the code provision is strictly in line with the judicial rulings of our State and Federal courts. Our valley neighbors must give the miners of this State credit for possessing at least a fair amount of intelligence, and their former obedience to laws that wrought havoc and ruin in their midst is a sufficient guaranty that they will abide by the conditions imposed by this, or any other, legal enactment."

"A definition of hydraulic mining was made necessary by the terms of the so-called 'Caminetti Law.' That act provided that the term 'hydraulic mining' should have the definition given to it in the State of California. That portion of Senate Bill No. 50 defining hydraulic mining meets the requirements of the 'Caminetti Law' in this respect."

"What is your opinion, Mr. Ford, in relation to the bill providing for the Debris Commission?"

"That bill, known as Senate Bill No. 389, is wholly and strictly supplemental to the 'Caminetti Act.' It provides that the Governor shall, on or before the first of next January, appoint a Debris Commissioner. This Debris Commissioner has authority to appoint a secretary. The bill further appropriates \$250,000 to be used in the construction of restraining works for the purpose of restraining mining debris. This appropriation, however, does not become available until Congress shall have appropriated at least as much for the same purpose. But when Congress does appropriate that amount, and as much more as it pleases, then this appropriation will become available and must be expended under the direction of this Debris Commissioner. All expenditures under this act are to be subject to the approval of the State Board of Examiners. The intention of the act is to enable California to co-operate with the general government in the construction of works necessary to permit hydraulic mining to be carried on under restrictions and limitations imposed by law."

"Mr. Ford, do you not think, in view of the passage of these laws, both in Congress and in the State Legislature, that the conditions are much more favorable for hydraulic mining than they have been since the original North Bloomfield decision?"

"There is not the least doubt of it. By this legislation both the State of California and the General Government are committed to a policy which cannot result otherwise than beneficially to the business of hydraulic mining. California has said that she will give \$250,000 to aid in the rehabilitation of this industry, provided that the General Government will give at least as much. California has now, through her Legislature, named the conditions upon which hydraulic mining may be resumed, and has shown her willingness to assist hydraulic miners in making it possible for them to comply with these conditions. The General Government, while it has not as yet gone as far as California in this direction, has started out by recognizing the industry and providing legal machinery whereby it may be resumed. The only thing involved now is for the Federal Government to meet the invitation of California and appropriate a sufficient sum of money to construct the required works to enable this industry to be resumed. I should say that the outlook is particularly encouraging. True, our miners must be yet a little patient. They must not for a moment imagine that enterprises of this nature and work of this magnitude can be accomplished in a day. We have gone a long distance in the right direction, and, if the miners are united, firm and persistent, they will get what they are entitled to. There is one imperative necessity. The miners must keep up their organization. Through the State Miners' Association and its branches, they have accomplished what has been done by way of legislation in both Congress and the State Legislature. Too much praise cannot be bestowed upon that organization, its executive committee and its officers. I should like to name personally some members of that association who have done heroic work for the miners, but it is hardly proper for me to do so on this occasion. Suffice it to say that in the Miners' Association, in its prosperity and in its success, lies the success of the cause of the miners. For years the miners have been fighting single-handed and individually against powerful organizations composed of the best men of the valleys, backed by abundance of means and the best counsel they could employ. Now, for the first time in the history of California, the miners have an organization officered by some of the best men of our State, the result of whose work has been such legislative fruit as two years ago was not dreamed of by the wildest mining enthusiast. I wish all of the miners in California could thoroughly appreciate the good work done by their association and the necessity for their continuous and enthusiastic support of it."

A CURIOSITY.—H. T. Tripp, of Tripp's mine near Big Bar bridge, a few days since found in one of the tunnels several beautiful pieces of gold which were shaped like the frond of a small and delicate fern. Several molds of the same shape were discovered in which there was no deposit of gold. Evidently at one time growing ferns were submerged in a liquid substance which solidified into slate, and that a mold was thus formed into which gold was lodged and, by a process of nature, shaped to fit the mold. The gold was found several hundred feet from the surface of the ground, which proves that in ages past the earth in this section was disturbed by volcanic action. Mr. Tripp will send the curiosity to the World's Fair.—Amador Ledger.

PROSPECTORS just returned to Julian, San Diego county, from the desert, report the finding of good placer grounds 60 miles below Indio.

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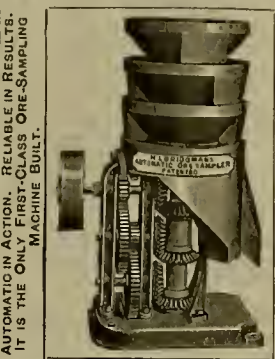
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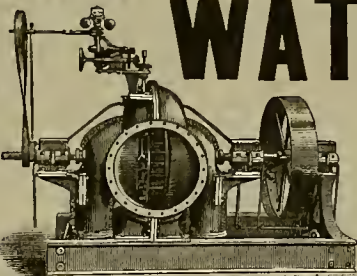
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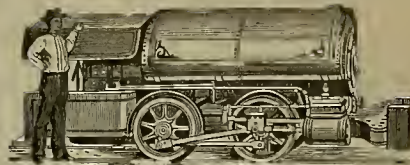
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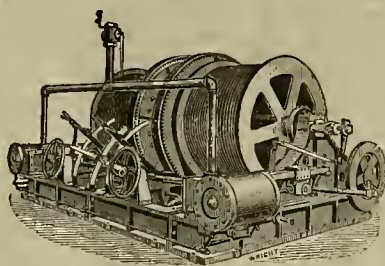
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Mechanical Progress.

Measuring Vibrations of Steamers.

At a meeting of the Institution of Naval Architects a paper was contributed by Herr Otto Schlick "On an Apparatus for Measuring and Registering the Vibrations of Steamers." Herr Schlick stated that he had succeeded in producing an apparatus, to which he had given the name "pallograph," founded on the principle of so hanging a weight that, in consequence of its inertia, it took no part in a given direction in the tremblings and oscillations of the point to which it was suspended. As it appeared necessary, for the purpose of the experiment, to take cognizance of the vibrations in a vertical and a horizontal direction, the apparatus possessed two weights—one which could only move in a vertical and another which could only move in a horizontal direction. Herr Schlick describes the apparatus at length, and proceeded to state the results of a series of experiments which he carried out with it on board the twin-screw dispatch boat "Meteor," belonging to the imperial German navy. The vertical vibrations always attained their maximum when the horizontal were at the smallest, and vice versa. This phenomenon was peculiar to twin-screw vessels only, and was explained by the difference in the number of the revolutions of the two engines and the reaction of the masses of the moving parts. The horizontal direction was exactly the reverse, and the action of the masses of the heaviest moving parts of the engines—the connecting rods and cranks—neutralized each other because they were of equal size, and acted in opposite directions. The older passenger steamers had much smaller dimensions, and the engines, as was well known, ran at much smaller speeds than those of to-day. The smaller the length of the ship the greater was the number per unit of time of its vibrations. There could be no idea of a union between the number of the vibrations and the number of revolutions of the engines of the older type of steamers, and therefore they did not manifest remarkable vibrations. As progress, however, was made in ship-building, the principal dimensions steadily grew, the period of the vibrations became steadily longer, while the necessarily greater engine power which was requisite compelled the increase of the number of revolutions. We had thus arrived at a period when the time of a vibration and of a revolution of the engines agreed, and when for the moment the usual type of ship showed severe vibrations.—The Colliery Guardian.

Rapid Transit in New York.

Rapid transit in New York, through the Manhattan Railway Company, has been decided upon by the Rapid Transit Commissioners, and it is probable that the former will eventually accept the terms offered, although at present they are protesting, as might have been expected, against them. The plan involves the following: First: A line from the Battery, along West and Barrow streets, to Bedford street, thence across Bedford, Commerce, Morton, Bleeker and Cornelia streets to the present Sixth avenue line at West Third street. Second: A line from the Ninth avenue line near 108th street, along 108th street, the Boulevard, Hamilton place and Tenth avenue to Fort George. Third: Within two years the present Ninth avenue road is required to be converted into a four-track railway between Barrow street and 108th street, with both express and way stations at Fourteenth, Forty-second and Fifty-ninth streets. Fourth: A third track on the Sixth avenue line is required between Eighth street and the junction of the new line at West Third street. Fifth: The foundations and structures of the lines provided for and the four-track line between Barrow and 108th streets, as well as all parts of the present system that shall be reconstructed, shall be such as to permit the running of five-car trains at a speed of 35 miles an hour between stations. The foundations and structure of the new line shall admit of the construction of four tracks thereon and shall have three tracks to begin with, excepting the part between Battery place and Sixth avenue, and within three years of the completion of the branch line or extension to Fort George a branch line with not less than two tracks shall be built from 162d street, along the Klgsbridge road and Broadway, to the northern city limits. All the above improvements provided for south of Fort George shall be completed within two years after the acquisition of the consent of the property-owners and municipal authorities for right of way. The company is given the option to lay and construct a fourth track from Greenwich street to Barrow street and

Battery place, in addition to the fourth track hereby authorized and required on the Ninth avenue line. The franchise shall be subject to the right to construct and operate the underground road heretofore laid out by the commission, or that may be laid out hereafter, under the Boulevard. The Manhattan Railway Company is required to pay into the city treasury all the expenses of the commission since its organization and any that may be incurred by it in the future, and shall pay annually five per cent of its net receipts, meaning thereby its gross receipts less taxes and operating expenses.—Electrical World.

Bullet-Proof Textures.

Two Teutons awoke one morning last week to find themselves famous, says *Iron*. We refer, of course, to Herr Dowe, of Mannheim, and Herr Scarneo, of Vienna. Because these worthy gentlemen have simply improved upon the well-known redskin plan of loosely placing a wet blanket in front of the person pattering up against which rifle bullets fall harmlessly to the ground, they have during the past few days had interviewers not only to the right of them, to the left of them, and in front of them, but generally all over them, against whose volleys—of questions—even the now famous coat of mail has not been invulnerable. Curiously enough, the idea of the hemp or cement and Sheffield steel-wire netting protection will be found to be far from new. If we mistake not, it dates from a period not long anterior to the invention of the rifle itself. Our Iron Duke is said to have had a bullet-proof jacket submitted to him by an inventor, who incontinently decamped when Wellington requested him to don the garment, and simultaneously ordered a couple of fusiliers with loaded rifles into the room. Then there was the individual who, struck by the success of the method adopted by one of the Carlist regiments of carrying a sheet-iron screen in its van, invented a protective covering somewhat after the style of the Dowe-Scarneo material. But there seems to be no doubt that the much-noised German-Austrian composition cannot effectively be used as actual wearing apparel. In the first place, the substance is not sufficiently flexible; secondly, the soldier, especially in summer, would scarcely be able to bear the heat induced by it, even if he could afford to support its additional weight. Then the appearance of the uniform must be considered. The coat, if not absolutely—so to speak—Dowe-dy, would scarcely be picturesque. On the whole, therefore, it is not at all improbable that when the customary nine-days' wonderment aroused by the advent of the bullet-proof textures has subsided, we shall hear very little more about them. Herr Mannlicher, who devised one of the best rifles ever placed in the hands of a soldier, has not an encouraging opinion of them.

WHAT IS STEAM?—The above question is frequently asked of engineers nowadays, and, although, they make constant use of steam, very few will answer that "steam is an invisible gaseous fluid, generated by the aid of heat from water." Many of them, when told that steam is invisible, laugh and say they know better, because they see it every day. If one of these wise men who claim the honor and name of practical engineers will take a look at the water-glass in the boiler-room, if they have one—if not, let them look at the one on their neighbor's boiler—and then tell if they can see any steam inside of it. If the glass should happen to burst while they are making the observation, they will, no doubt, see plenty of what they call steam in the vicinity, and they might also see the same if the safety valve should happen to blow off. Why, then? Simply because steam is invisible, and so long as it is confined you cannot see it, but when it is cooled off, as when it comes in contact with the air, and is consequently condensed again to the water from which it originated, it becomes visible to the eye, like water in very small particles, as in a fog. Viewed at such times it has lost its characteristics as steam, and instead of being a gaseous fluid it has become condensed to water in very small particles, which occupy considerable space. When in this condition we see what we call steam, but when an engineer notes the flow of steam from gauge cock or safety valve, he will notice that near the opening nothing is visible, while at some distance he sees fog. The reason of this is that at all times steam is invisible while it remains steam, but by condensation and the formation of water a fog is produced, which can be seen and distinguished in no way from the fog which rises from rivers, swamps, or other bodies of water during such times as the temperature and other conditions are favorable to its formation.—Machinery.

Scientific Progress.

Prehistoric Remains in America.

There is one fact in regard to the prehistoric and protohistoric remains of North America which does not appear to have received the attention it deserves.

If we examine carefully the descriptions and figures of these remains so far as published and attempt to classify them, we soon find ourselves forced to admit that there are two well-marked, general classes of types, the one belonging to the Pacific and the other to the Atlantic slope. The characteristics which distinguish these two classes are both numerous and well-marked. Geographically, the Rocky-mountain range appears to be the dividing line as far south as the Rio Grande, Mexico, and Central America, belonging to the Pacific-slope section.

Although the remains of the Pacific division present many types, varying in the different sections, yet there is such a strong general resemblance, on the one hand, of those found from southern Alaska south to the Isthmus (excepting a gap in California), and, on the other hand, such a strong contrast with those of the Atlantic slope as to justify the conclusion that this arises from ethnic distinctions and indicates different races. Mr. Swan has long been calling attention to the resemblance between the types of the region inhabited by the Haida Indians and the remains of Mexico and Central America, and no one who will make the comparison will fail to be convinced. Professor Dall, who has studied the manners, customs and remains of the Northwest Coast, reaches the same conclusion. I cannot enter into details in this brief article, but ask any one who doubts the correctness of this conclusion to compare the figures given by Ensign A. P. Niblack, in his work on "The Coast Indians of South Alaska and Northern British Columbia," with those found on the monuments of Mexico and Central America, and then with the types of the Atlantic slope. It is true that the former are modern, yet the resemblance both in general character and combination to those of Mexico and Central America is too marked to be overlooked, while no such resemblance to those of the Atlantic slope is observable.

Do not these resemblances on the one hand and differences on the other have an important bearing on the question, "From whence did America (or rather North America) derive its original immigrants?" That the works of the two slopes present two distinct classes of types cannot be denied. That there is in California a break in the continuity of the types of the Pacific slope, which seems to indicate an overflow from the Atlantic side, only seems to emphasize the above conclusion. The marked similarity between the types of the Pacific slope and the Pacific islands has been referred to by Professor Dall (3d Ann. Rep. Bur. Eth., pp. 147-151), who finds that they have prevailed "from Melanesia to Peru and from Mexico to the Arctic." In summing up, he remarks that "the mathematical probability of such an interwoven chain of custom and belief being sporadic and fortuitous is so nearly infinitesimal as to lay the burden of proof upon the upholders of the latter proposition." Professor Dall does not argue from this a common origin of the people possessing these characteristics, but believes they have been "impressed" upon the inhabitants of the western coast from the Pacific side. Notwithstanding this disclaimer, does not the evidence indicate two streams of original immigration, one to the Atlantic and the other to the Pacific coast? Ensign Niblack, although disclaiming any inference to be drawn therefrom as to relationship, gives a list of resemblances between the customs and works of the New Zealanders and Haida Indians that is certainly remarkable.

The idea that America was peopled by way of Behring straits is somewhat losing its hold on the minds of students, and, as a usual result, there is a tendency to swing to the opposite extreme. Drs. Brinton and Hale are inclined to believe, chiefly from linguistic evidence, that the first settlers came from Europe to the north Atlantic coast. The former says in his "Races and Peoples," pp. 247-248: "Its first settlers probably came from Europe by way of a land connection which once existed over the north Atlantic, and that their long and isolated residence in this continent has molded them into a singularly homogeneous race, which varies but slightly anywhere on the continent and has maintained its type unimpaired for countless generations. Never at any time before Columbus was it influenced in blood, language, or culture by any other race."

Now it may be that settlers came from

Europe to the north Atlantic coast, but the evidence is decidedly against the remainder of the above-quoted paragraph, which is, in fact, somewhat self-contradictory. For, if the settlement was at one point, by one race, and this race was never influenced by another, it is difficult to imagine in what respect the molding process acted. However, the chief objection is to the theory of a single original element, and the assumption that it was never influenced in pre-Columbian times by any other race or element. The facts set forth by Professor Dall and confirmed by Ensign Niblack are too apparent to be set aside by any theory or mere declaration. Even without the evidence presented by these parties, the differences between the archaeological types of the Pacific and Atlantic slopes are sufficient to outweigh any argument that has been presented against intrusive elements.—Cyrus Thomas, in *Science*.

Light in Photography.

The action of light in the production of "latent" images, says the *Optician*, affords one of the most obtrusive of the unsolved problems of optical science, and without, for the present, going to the extent of proposing any new theory, we offer the following observations, in the belief that they may be of some interest to a considerable number of our readers:

It was taught by Mendeleeff that "molecules consist of atoms in a certain state of distribution and movement, just as the solar system is made up of inseparable parts (the sun, planets, satellites, comets, etc.)" and again ammonia may be represented in the simplest manner by supposing the sun, nitrogen, surrounded by its planets of hydrogen; and common salt may be looked on as a double star formed of sodium and chlorine." A similar hypothesis has been advanced by Boltzmann and adopted by Crookes, and it has been recently referred to in an interesting article in our contemporary *Photography*, the "double star" dealt with being the molecules of silver and bromine.

The hypothesis that the cumulative action of light is in some cases a purely physical one is undoubtedly very attractive, and we may say at once that an article is under consideration and may be published in course of time in *Science* *Stiftings*, in which suggestions that light acts between photosensitive molecules partly as "radiation pressure" and partly also through the agency of *tides* (not necessarily wholly material, involving the relative motions of parts of the molecules, but perhaps electrical, involving only the molecular charges) will be introduced and discussed. The fully-accepted idea appears to be that photography is always dependent upon the absorption of light in the accomplishment of intramolecular work.

If there is anything much in the idea of radiation pressure in this connection (which we do not assert), it may be that a latent image can be impressed without absorption of light. But we prefer to consider that the process is not a direct effect of light, but rather one of intramolecular vibrations, the electric, kinetic, magnetic and other out-of-the-way image-forming forces being simply excitants, capable, like bell-hammers, of setting the molecules ringing in their natural tones. Accepting and using for the moment the "double star" hypothesis above alluded to, the adaptation of possible continuous and "tidal" actions to the explanation of reversal, with loss of sensitiveness, affords a wide field for speculation. Apart from the loss of sensitiveness, the alternate reversals suggest comparison with the beats of tuning forks, etc., as if the tidal actions between the molecules were very slightly out of phase.

THE canals on Mars, says Dr. A. Tooska, in *Die Natur*, are simply rifts in the crust of that planet, due to collisions with one-time satellites. To support this theory, he says that one of the present satellites of Mars, "Phobos," revolves around that planet at a distance of only 806 miles, and is within the limit where the attraction of gravitation is in equilibrium with the centrifugal force. It is approaching Mars at an ever-accelerating rate, and in a few decades, perhaps, it may strike the planet at a lower angle, and running along its surface, make another "canal." It would form two parallel elevated crests, which, after cooling, will be covered with snow and ice. Under the great heat of contact ice would be melted, and the furrow filled with water. This water would again freeze and present the bright line, relieved by the shadows of the high mountains, familiar to observers. Mars, in its eccentric orbit, passes through the orbits of numerous other planetoid bodies, and may have had frequent collisions with them.

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In the adjoining column we present the specialties of Hydraulic Mining Machinery built by the Joshua Hendy Machine Works, who have their principal office at No. 51 Fremont Street, this city, and who have, also, an extensive, large and commodious foundry and machinery constructing plant in the block bounded by Bay, Kearny and Francisco Streets, near the sea-wall, in the northern portion of the city.

These Works have, for years past, made a specialty—in connection with other departments of mechanical business in which they have been and are now engaged—of the building and furnishing of Hydraulic Mining Plants, in which are comprised Hydraulic Water-pipe, Hydraulic Giants, Hydraulic Gravel Elevators, Water-gates, Reservoir-gates, Air-valves, and all of the necessary and required outfittings for Hydraulic Mining Plants under any specifications and conditions of use.

HYDRAULIC GIANTS.

Certain improvements have been introduced into the construction of the form of Hydraulic Giants presented in the cut; these improvements relate to that class of apparatus for hydraulic mining in which a jointed nozzle is used to direct a stream of water against an auriferous gravel bank or other workings, which consists in a novel method employed in the construction of the ball which forms the joint of the nozzle-pipe.

The object of this improvement being to, and necessarily does increase the discharging capacity of the nozzle.

To prevent a rotary motion of the water after its discharge from the nozzle-pipe, vanes or rifles are inserted in the pipe. These rifles are so arranged as to force the water to issue in a straight line from the nozzle, which prevents the scattering of the stream, on the solid or columnar form of which so much of its effectiveness depends.

DEFLECTORS.

In the larger sizes of Giants, deflectors or deflecting nozzles are used, by which the stream of water can be directed or deflected at any angle and to any point with the greatest facility.

HYDRAULIC MINING PIPE.

In the early days of hydraulic mining canvas hose was used, but in the progression of events the discovery of the superiority of wrought-iron riveted pipe was made known and has since been adopted.

These Works are prepared to furnish pipe of all sizes and strengths of iron and recommend that they should be made of graduated strength, according to the pressure to be resisted. They should be larger and lighter near the pressure box at ditch or reservoir and smaller and stronger near the nozzle.

WATER GATES.

The cut on this page illustrates an improved form of Water-Gate built by these Works; the parts which have to sustain the maximum strain or pressure, it will be found, are thoroughly ribbed and thereby made durable, at the same time preserving an elegance of form.

These Works further furnish Reservoir Gates for either Masonry, Wooden or Earthen Dams.

HYDRAULIC GRAVEL ELEVATORS.

We further refer to the illustration presented of an Hydraulic Gravel Elevator in position. The principle upon which the operation of these Hydraulic Gravel Elevators is based is the simple fact, which is well-known by hydraulic miners, that water and gravel can be driven up hill by hydraulic force, and that in a flume it is only necessary to give the impelling water more velocity to make it carry more earth or gravel before it. Miners, to accomplish this, give their flumes more grade. It is, therefore, only necessary to give water more velocity than it has through an ordinary flume to make it acquire sufficient force to carry gravel up an inclined plane. This fact suggested the construction of a form of machine which should so direct and confine the inherent hydraulic force of a stream of water as to impel before its power masses of earth or gravel or other heavy material, and the cut herewith illustrates the features of the machine devised for the accomplishment of that purpose, and to which the attention of those controlling shallow placers is especially requested.

In view of the fact that enactments have been recently passed by the Congress of the United States, entitled the "Caminetti Bill," and measures adopted by the Legislature of our State of California, we believe that hydraulic mining can yet be successfully undertaken, and to those who are now or may intend to become interested in this industry, we ask attention to the specialties here presented.

JOSHUA HENDY MACHINE WORKS

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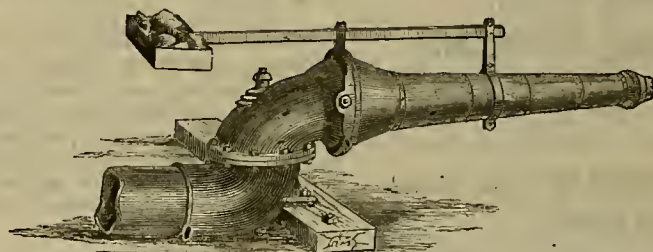
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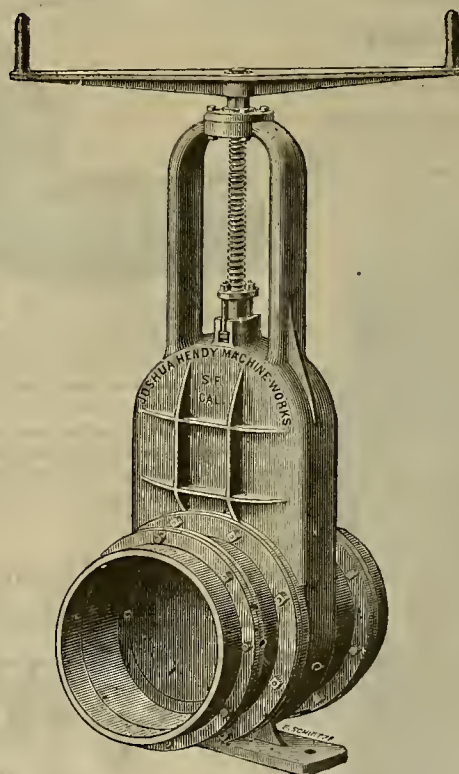
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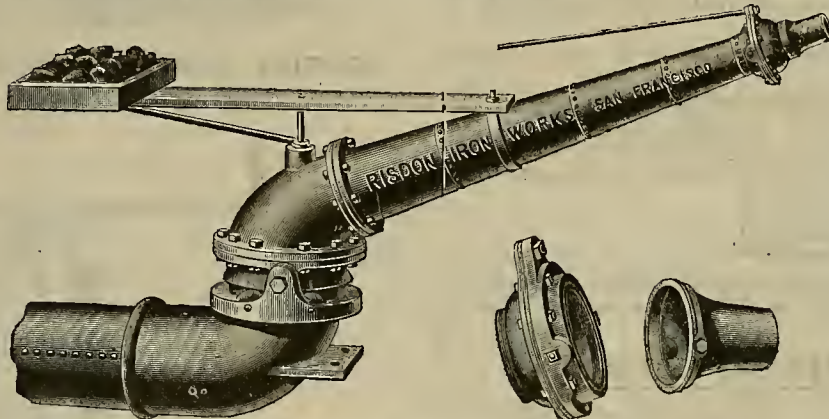
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Hydraulic Gravel Mines of California.

We desire to call the attention of miners to our new hydraulic machine, or HOSKIN'S NEW GIANT, which is the best machine ever offered. We have dispensed with the center bolt, used in the old style, and which was so liable to catch trash.

There is a clear waterway through, and the capacity as to No. of size is also greatly increased. The horizontal and vertical motions are made with only one joint, and that a very durable one, and easily kept in order. The weight is reduced about 20 per cent, thus lessening the cost of transportation, and without decreasing the strength. This style of machine is also the easiest to work of any yet tried.



THE HOSKIN'S GIANT has earned a reputation which places it ahead of all competitors. Its ingeniously constructed deflector enables the operator to control the course of the stream with utmost ease and precision.

The deflector is an indispensable adjunct to all hydraulic machines. With it ten pounds force at end of lever will move the pipe in any direction with the greatest facility and the stream can be directed to any point with certainty; a rock pile can be stirred up or a sand streak followed and all operations accomplished with perfect ease.

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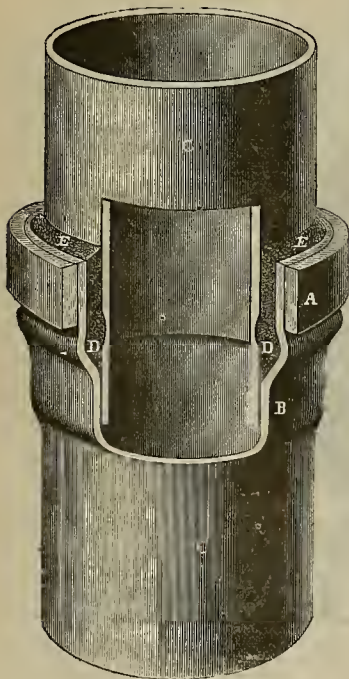
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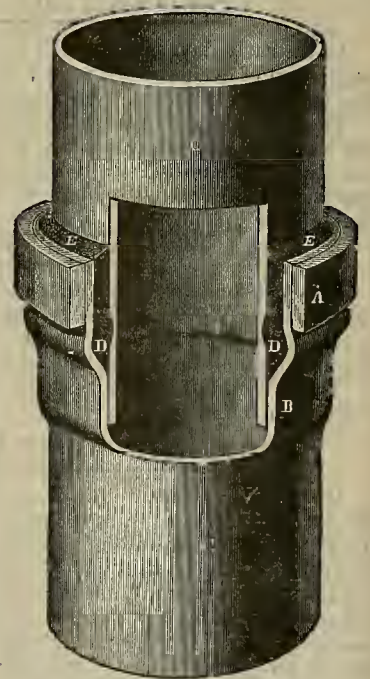
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OUT SECTION.



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B—Bell End Pipe.
CC—Body Pipe.

OUT SECTION.



D—Lead Space, showing Patent Lock Joint.
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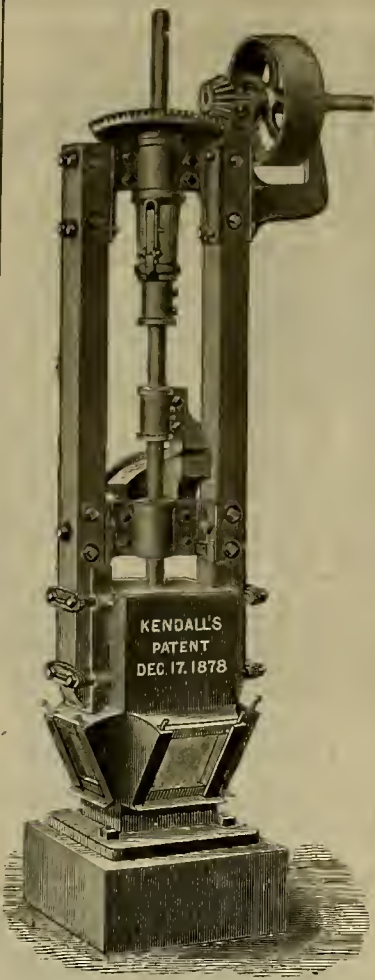
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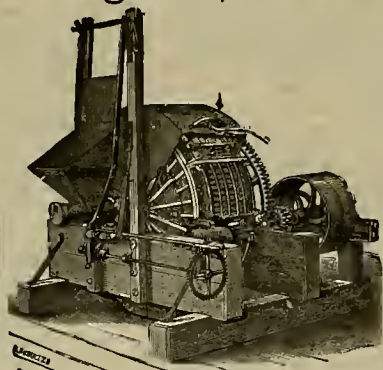
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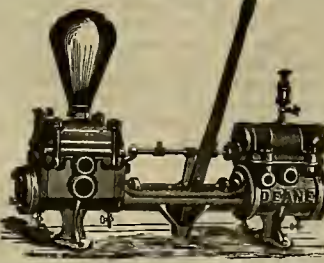
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The Arc Light as a Standard of Light.

Mr. Blondel suggests using the light from the crater of an arc lamp as a new secondary standard, for use specially in measuring white light such as that from the arc. He calls attention to the fact that the temperature of the arc is constant and independent of the current, and he has found that the brightness of the crater is also constant within wide limits of the difference of potential, the current, and the nature and composition of the carbons. To use this as a standard, he places the carbon at an angle of 20 degrees with the vertical, in which case the crater will be inclined 50 to 60 degrees, and will be completely visible for an arc of from four to five millimetres; it is not necessary that the light is emitted perpendicularly to the surface of the crater; in front of the arc is placed a screen with a small conical aperture; this screen is made double so as to allow water to circulate through its interior, or a porcelain screen may be used. Over this screen is placed a small disc, having different sized holes, and a small lens, any of which can be brought in line with the opening; the screen is placed within two to three centimetres of the arc; an opening of one square millimetre is found to give the best results. The effect of this screen is to focus or to cut off, as it were, all the light except that from the crater; the photometer is then placed in line with this conical beam of light. To assure oneself that only the light from the crater is used, the small lens above mentioned is placed in front of the hole, in which case a magnified image of the arc will be formed on a screen at the end of the photometer, from which it can be seen whether the light entering the photometer is that from the crater and not from the rest of the arc. A magnet may be used to direct the arc so as to keep the crater from changing its position; 70 to 75 volts (including the rheostat) and 0.2 amperes per square millimetre were found to give the best and most stable results; for instance, with 15 millimetre carbons, 75 volts, 40 amperes and 5 millimetres arc. He suggests that the Chicago Congress adopt as a secondary standard of light that emitted from the crater of an arc lamp; its value could be determined once for all in terms of the absolute standard. As it is not an absolute standard, it cannot be used as such, but merely as a convenient secondary standard. A full, illustrated description will be found in the bulletin of the *Soc. Int. des Electriciens* for March, and an illustrated abstract in *L'Ind. Electrique*, March 25th. (This proposed standard appears to be very similar to the one suggested by Mr. Swinburne.)—*Electrical World*.

The Saleve Mountain Electric Railway.

The London *Electrical Engineer*, March 24th, gives a short description, including considerable data, of this rack and pinion mountain road. The generating station consists of three turbines of 250 horse power each; their speed is only 45 revolutions and the horizontal dynamos are coupled directly on the turbine shaft; as this speed is exceedingly low, dynamos of a normal output of 1000 horse power are used in order to give the required power at this low speed; they are among the largest continuous current dynamos yet constructed, being ten feet in diameter and weighing nineteen tons. The generating station is about one and one-quarter miles from the central railway station; the conductors are carried overhead on telegraph poles and include two pressure regulating return wires; the conductor consists of a rail between the tracks resting on porcelain insulators; the current is taken off by means of a sliding shoe; the other rails are used as a return circuit; the loss in the lines is 15 per cent; the cars carry forty passengers and weigh complete, twelve tons. There are two motors operating cogwheels which gear into the rack; either is capable of bolting and starting a loaded car on a maximum grade, the motors are four-pole Thury dynamos of about 30 horse power; the speed of the car varies from 5 to 9.5 feet per second. Each car has four friction brakes, two electric brakes and two absolute stops; the electric brakes are formed by the motors themselves, which act as dynamos during the descent, their current being dissipated in resistances placed under the cars. The sides of the observation cars are almost wholly composed of glass windows. Each car has three axles, the middle one carrying wheels without springs; each one of the others has one loose wheel to facilitate turning the curves. The line is divided into three sections of about three kilometres each; about 250 horse power are required for ordi-

nary working; the maximum speed is six miles an hour and on 25 per cent grades three miles an hour; the upper station is 3800 feet above the sea.

Is Electricity a Myth?

In its practical, serviceable relations, assuredly no. But there is an active debate in progress, says the *Mechanical News*, among scientific scholars on the question whether there is, after all, such a thing as electricity, using the word "thiog" as implying a material entity—or whether it is merely an effect, or to speak more technically, a mode of motion. If the latter theory is accepted by the scientific world as correct, electricity will still be in very respectable company, for both heat and light have gone that way before. Not very long ago they were supposed even by philosophers, to be actual substances, not exactly tangible or ponderable, but still having a positive material existence, and liable some day to be weighed and measured, manipulated and transported like any other commodity. Practically, of course, this is done when a ton of coal or a pound of candles changes hands. But in any of these cases it is only the vehicle or agent which is visibly dealt in, and it will only be by a figure of speech that we shall ever ask for a hundred weight of heat or a gallon of light. The analogies of the case seem to point to the same conclusions, as regards electricity. What goes by the name of electricity may be generated and stored, and it is so treated for a multitude of familiar uses; but only in this view of the case, as light is stored in a gas tank or warmth in a cord of wood.

Possibly the question is not of much moment save as a topic of abstract controversy. But speculative inquiries such as this have led and will in many instances lead to results of vast practical usefulness to mankind.

GAS AND ELECTRICITY.—One often hears the statement that electricity for lighting purposes is making such headway that by it the use of gas is being displaced and less gas is being used. A careful study into the great strides made by the gas business since electric lighting has been introduced will show, as we have always contended, that such is not true. Most of the large gas companies, both here, abroad and in America, have increased their plants materially during the past few years, and continue to do so. In Berlin, for instance, the central electric stations supply at least 100,000 lamps besides a large number of private installations; and notwithstanding this, the consumption of gas has steadily increased, and the Corporation of Berlin has recently decided to build another gas plant with a capacity of about 12,400,000 feet per day. In Leipzig and other German cities there has been a proportionate increase. For illustrations we do not need to go very far from home. The gas companies in some of the American cities have also increased their plants. If there were no such thing as electric lighting the consumption of gas would most likely be greater than it is; yet it is surprising how the introduction of electricity is always attended with an increased demand for gas. One of the principal reasons for this is the cultivation of the public taste up to a higher standard of illumination. The electric light is so fine an illuminant, and with its use so much better results are obtained than with the use of the old methods, that the users of gas desire a higher candle-power and better gas, and use more of it than they formerly did.—*Machinery*.

RAILWAY LINES.—The Temps stated that the total length of railway lines in Europe, at the end of last year, was 142,658 miles, or 2590 miles more than at the end of 1891, this being equivalent to an increase of 1.85 per cent. The 142,658 miles of railway are distributed as under: Germany, 27,130 miles, with an increase of 317 miles; France, 23,715 miles, with an increase of 655 miles; Great Britain and Ireland, 20,435 miles, with an increase of 50 miles; Russia and Finland, 19,420 miles, with an increase of 85 miles; Austria-Hungary, 17,540 miles, with an increase of 655 miles; Italy, 8240 miles, with an increase of 175 miles; Spain, 6330 miles, with an increase of 155 miles; Sweden and Norway, 6150 miles, with an increase of 160 miles; Belgium, 3315 miles, with an increase of 62 miles; Switzerland, 2045 miles, with an increase of 50 miles; Holland and Luxemburg, 1925 miles, with an increase of 11 miles; Roumania, 1590 miles, with no increase; Portugal, 1430 miles, with an increase of 105 miles; Denmark, 1320 miles, with an increase of 18 miles; Turkey, Bulgaria and Roumania, 1074 miles, or no change; Greece, 572 miles, with an increase of 87 miles; Servia, 337 miles, and Malta,

7 miles, in neither of the two latter cases there being any change.

ELECTRIC DECK PLANER.—An electric deck planer has been devised by Mr. Malcolm Sutherland, an electrical engineer of Scotland, and it is in use by a well-known ship-building firm of Dumbarton, Scotland. The machine, as made and used by this firm for planing the decks of ships built in their yards, is exceedingly simple in construction, and resembles a lawn mower in form, being handled in the same way, and it is started with as much ease. A steel base-plate is mounted on rollers, and to the under side of this the revolving cutter is attached, whilst the electric motor is placed on top and geared to the cutter by spur wheels, which are covered by an iron guard. The front roller is of the same length as the cutter, so that in passing over the deck it lies on the crests of the uneven parts of the deck and keeps the machine practically level. The hind rollers are set in so that they follow in the wake of the cutter. The machine is fitted with eccentric bearings, and by moving a lever they can be raised or lowered, thus making the cut greater or less as required. The results obtained are very satisfactory, as it is a great advance on hand work so far as regards time, while it relieves the men of a very disagreeable job, as deck planing by hand involves kneeling or sitting on the deck in a most uncomfortable position.—*Electrical Age*.

Useful Information.

Training a Horse.

A horse should never be deceived by word or action. When a rider or driver pulls the reins and says "whoa," he should mean it and stick to it. But to cry "whoa," jerk the reins and lash the horse at the same time, is confusing and means nothing. It is quite common to say "whoa" when it is only intended to go slower or when the horse has not stirred a foot, to let him know of your presence. One day, when your life may depend upon a "whoa," you will find that your horse is not stopped by it because you have entirely played it out of him. Speak always in a natural tone of voice under all circumstances. Always let your horse face the object of his fear, and when frightened remember the slower you move your horse the more power you have over him. There are times when letting a horse trot is almost as bad as letting him run away. Fear is something a horseman should never exhibit in his countenance or voice, as the horse is a close observer and soon learns to take advantage of such indications to become careless of control, if not, indeed, aggressive. Let your lessons be thorough but not very long. Be gentle and patient with the colt, but make the willful, stubborn horse feel the full extent of your power till he submits.

The way to educate a horse not to be afraid of things is to get him used to them by bringing him into frequent contact with them. If the horse is afraid of the report of firearms, just throw him down and fire off a pistol over him. Whenever he makes a motion to get up pull the strap that holds him down and fire off the pistol again. This can be repeated and a lesson should last 30 or 40 minutes. The next day give him another lesson, and in about three days the horse will pay no attention to the discharge of firearms. Another cause of trouble is restiveness, which comes from bad handling and from a too eager disposition. It tells of a nervousness or impatience which develops easily into a multitude of vices, such as rearing, backing, bolting, balkiing, and even viciousness in shoeing when badly handled. The restive horse can easily be made an inveterate balker. It is difficult to cure when it becomes a confirmed vice. Gentleness and patient firmness of the trainer must cure and prevent. Many an ambitious horse is ever ready to start, unless he has been taught never to start until the word is given. It is easy to train the average horse not to start unless the lines are drawn and the word given. Horses are less to blame than drivers for the habit of starting too soon.—*Kansas Farmer*.

The Age of the Earth.

Among the wider problems of natural science toward the solution of which contributions have been made during the last month, the most striking is that of the age of the earth. Mr. Clarence King, the well-known American geologist and explorer, contributes an elaborate article on the subject to the *American Journal of Science* (ser. 3, vol. xlv., pp. 1-20, pls. i., ii.), in which he claims

to have advanced Lord Kelvin's method of determining the earth's age to a further order of importance. He discusses the experimental investigations of Dr. Carl Barus on the effect of heat and pressure on certain rocks, and particularly selects the case of diabase, which has a specific gravity approximately equal to the average specific gravity of the earth's crust. In the light of the new facts, he then reconsiders the probable rate of cooling of the earth, rendering more precise the conclusions of Lord Kelvin. As the result of the detailed discussion, Mr. King concludes that the earth's age probably does not exceed twenty-four millions of years—in fact, that the estimate of the physicists is approximately correct, while that of the geologists is "vaguely vast."

Stocking California Streams With Fish.

The Fish Commissioners of California propose to stock the upper part of the Sacramento river near Delta with black bass this year. Although some sportsmen object to the stocking of this beautiful stream with bass, because they are said to be big enemies of the trout, Commissioner Murdock has been informed that the bass and trout live on friendly terms, which assertion, he says, can be proven correct by the keeper and anglers who fish in San Andreas lake. The bass may kill numbers of small fishes, but as a general thing young trout can keep well out of the way of the ravenous sticklebacks when they have a sufficient amount of water to paddle their own canoe. It is also proposed to stock a part of Eel river, about thirty miles north of Ukiah, with black bass. The experiment of stocking the Russian river has proven a success, and now bass from two to three pounds in weight are enjoying the cool waters of that swift-flowing stream. An attempt will be made to introduce the fresh-water eel on this coast. Experienced pisciculturists contend that no better river than the Sacramento could be named for that purpose. The fresh-water eel is a delicious fish, and is highly prized by epicures of the old countries. The Commissioners, however, expect to hear from some source that the eel is destructive to salmon spawn.

Reports have been received from the San Joaquin river that Chinese fishermen are catching small striped bass in the sloughs near Antioch by means of small-meshed nets, which are dragged along the sloughs where the bass are known to frequent.

The following are the rivers and streams of this coast which have been stocked within the past year with Eastern (New Hampshire) trout: Garcia river and tributaries, Mendocino county; Olema creek, Marin county; Austin creek and tributaries, Sonoma county; Pescadero, Smith and Buteno creeks, San Mateo county; San Lorenzo river and tributaries, also Laguna and Soquel, Santa Cruz county; Calaveras creek and Austin gulch, a tributary of the Los Gatos creek, Santa Clara county; San Antone creek in Calaveras county; Hal-leck gulch, a tributary of Nicasio creek, Marin county; San Vicente, Granite and Scott creeks, Santa Cruz county; also some streams in Sonoma and Placer counties have been stocked by the most handsome of American fresh-water trout.

It is yet too early, according to the Commissioners, to predict the success or failure attached to the stocking of the waters mentioned with Eastern trout. None of the youngsters resembling New Hampshire trout in appearance have been caught so far this year, and the Commissioners fear that their efforts in this direction will prove of small value. The general opinion, Mr. Redding says, is that the Eastern trout follow the example of the home production—the steelhead—and leave the coast streams at the end of the winter season for the ocean, and that they also lose their brilliant markings and take on a silvery coating, which makes them resemble young steelheads in every particular.

SKIN DISEASES IN CALIFORNIA.—Dr. L. P. Simmons of Sacramento, at the recent Sanitary Convention in this city, read a paper on "Skin Diseases in the Central Part of California." The climate, he said, keeps the skin in a normal condition, and has a great deal to do with the lack of skin troubles in the central sections of the State. Then, too, the people here are not crowded together as they are in the East and in Europe, and so parasitic skin diseases are of comparatively rare occurrence, but in this connection Dr. Simmons said that among the Chinese there are very few cases of parasitic diseases, notwithstanding the unsanitary way in which they crowd together. Leprosy, he said, may be bidden for a long time, and personal contact may spread the

disease even before a sore breaks out on the body. Dr. Simmons reported four cases of leprosy in central California, and gave a short history of each case. He also cited the case of an almost full-blooded negro of Sacramento, who in the last few years has become afflicted, or otherwise, according to how the case is looked at, with the disease called "vitiligo," and as a result he has turned from a rich polished ebony hue to pure white. He is not at all proud of his metamorphosis, and has positively refused to exhibit himself. He still has a black spot under each ear, which he cherishes as he would his eyesight, but even these spots are slowly leaving him, and within a year he will be, as far as color goes, a Caucasian. Dr. Simmons says that this case is the most interesting that he has heard of.

A discussion followed in which leprosy took up the most part, and other causes were cited. Dr. Regensburger also mentioned a few more skin diseases and described their symptoms. The case of leprosy that appeared in the City and County Hospital quite recently was also brought up, and the woman's symptoms described and discussed.

THE total number of vessels in the British mercantile marine, says Lloyd's latest returns, is 21,542, with an aggregate tonnage of 12,203,761 tons. Of this number 7,960 are steamers with 8,980,203 gross tons, or an average considerably over 1,000 tons each. Last year England added 872 vessels of 984,670 tons, of which 21,000 tons were purchased from foreigners. But England also sold to foreign nations, chiefly Norway, France and Germany, 117,000 tons more than she purchased. In the last six years nearly four and a half million tons of steamers have been added to the register, and only 1.6 million tons have been removed; and of the latter the greater number have only changed flags and are still competitors for trade. In the same period 913,000 tons of sailing ships have been added on 1,206,000 tons removed; so that there are fewer sailing ships on the register now than in 1887.

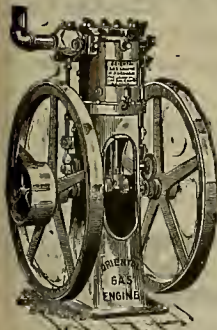
A WELL KNOWN ARCHITECT AND ENGINEER tells the *Sun* that it will not be long before all the public halls and theaters are ventilated in the same way as Carnegie Music Hall. At present this building is unique, in that it is supplied with air through perforations in the roof, the exhaust taking place through the "risers" under the seats. The air can be supplied so fast that the freshness and temperature are kept nearly at the normal, and the gallery, instead of being the worst place in the house, is the best, in so far as it is close to the air supply. This mode of ventilation is only possible, however, where electric lights are used, for the heat generated by gas causes the foul air to rise, and an escape for it must be found in gallery windows or the roof.

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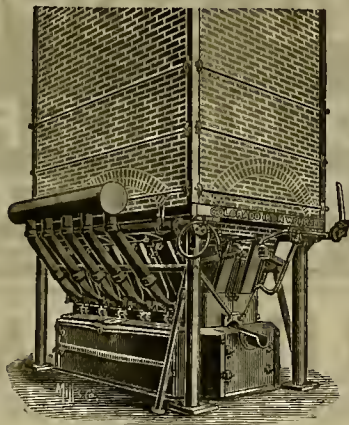
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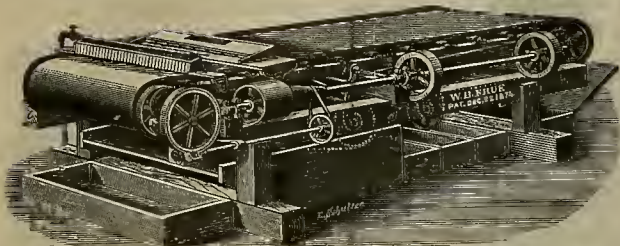
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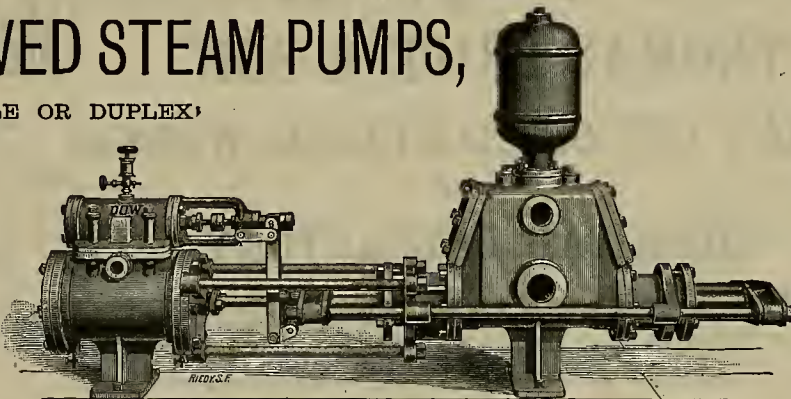
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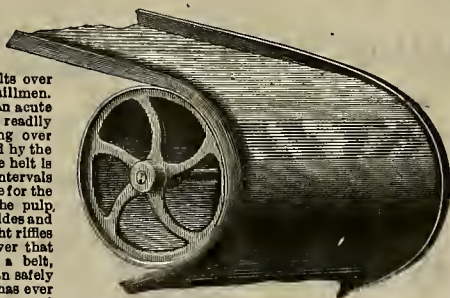
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Mining Summary.

The following is mostly condensed from journals published in the Interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NOTES.—*Ledger*, April 28: Jas Dooley, who secured the contract for the Farrell and Albany mine road, has several men at work and will complete the 2200 feet of road in a few days. At the Hardy mine, on the Baretna property, they are now excavating and sinking the mortar blocks for a five-stamp mill. This property joins the Astoria and the Farrell property on the Calaveras side. The Bright mine, the property of Bright and Schober, has been bonded to San Francisco parties for a year. They expect to do some work upon the property as soon as the necessary arrangements can be made. In the Wildman, at Sutter Creek, the face of the 1000-foot drift is now cutting stringers of quartz of a favorable nature which is now being run in the mill. We hope that the permanent ore-body will soon be found and the pay-roll increased. The Pioneer people are perfecting plans toward the opening up of that valuable property this fall. They have had several offers for the property, but none of them have come up to the ideas of the owners, Messrs. Detert, Taylor, Eudey and Frances, so they intend to conduct it themselves. At the Albany manager, J. H. Tibbitts, reports that the face of the Littlefield tunnel is now looking very encouraging. Stringers of quartz are now being encountered giving low assays, and seepages of water denoting the fact that they are near the main ledge which crops out so prominently upon the surface. At the Farrell the work was suspended for a few days because the contractors could not make wages at the price they took the work for. Their price was raised \$2 per foot and they resumed work Saturday night and are progressing rapidly, running two shifts. Mr. Seligman is more than enthusiastic over the developments. He has several tons of ore upon the dump which he will send to Selby's as soon as the road is in condition for hauling. The latest rumor in mining circles is that the Kennedy people are arranging to purchase the Bell Weather of Sam Bright, the owner. The people of Jackson would not only like to see Mr. Bright make a good sale of the property, but would also like to see it pass into the possession of some one who is able to thoroughly equip and develop the property. The Kennedy people could do so with the greatest facility possible.

THE BRIGHT MINE.—*Amador Dispatch*, April 28: The Bright mine, located on Schober's hill near the Zeile mine reservoir, has been bonded for one year, for the sum of \$30,000, by Mr. N. A. Brady, for a company of capitalists in San Francisco, who will commence the work of developing it in a thorough manner, without unnecessary delay. It is understood that the work will be done under supervision of Mr. A. B. Oliver, an experienced mining man. Mr. Oliver was up here last week and made an investigation of the ledge and expressed himself as being very confident that it could soon be made a valuable property. The company that has taken the matter in hand is abundantly able to make a thorough development, and we have no doubt that it will soon place it among the list of dividend-paying mines, as all the indications, as far as it has been prospected, are of the most favorable character. We shall await further developments with much anxiety, as the establishment of another good mine here will add very materially to the prosperity of our town.

Inyo.

FISH SPRINGS MINES.—*Cor. Inyo Register*, April 29: The Fish Springs mines are looking well. Upton Tracy was in yesterday and reports a fine strike of gold ore made by Cnnha and Tracy. Mr. Tracy says that the ore-body is getting stronger as depth is attained, and that in sinking a vertical shaft on the vein they get a thousand pounds of good working ore per diem. Their rock yields about \$40 per ton. John Commetti is taking out a quantity of good working rock. Gilliam and Broder are pleased with the appearance of their prospect and will soon make a run at their "water-mill." John Escallon reports his claim, the Gold Bug, in fine shape, and says he will commence crushing ore some time during the present week.

Mono.

A GENERAL SHUT DOWN.—*Bodie Miner*, April 26: The Standard mine and mill will shut down temporarily the latter part of next week, and the Bodie will follow suit shortly thereafter. It is not known at this time how long operations will remain suspended, but it can be safely said it will be at least a month. This undesirable state of affairs is brought about by a scarcity of wood. When the Standard Co. last year began work on its electric plant it was calculated to complete it and have it in running order by 1st of last January, but owing to the early and severe winter and unavoidable delays, it has not yet been finished. The annual supply of wood was not laid in, the railroad bringing in altogether last summer only 5000 cords, and so now there is a general shortage. It is now said that if everything progresses favorably, electricity will be brought in by the 1st of July. Work on this end of the line is practically at a standstill on account of the non-arrival of certain blocks for the foundation of the machinery, but these are expected to come with the next team. A team left Bridgeport this week for machinery for the Green Creek end. In the meantime the Standard has purchased all the wood to be had in town, and it will probably be a month before any can be brought in from other places.

HAULING ORE.—S. B. Burkham has been

hauling ore this week from the Syndicate mine to the mill. Owing to the softness of the snow during the day he has been compelled to do the work in the night. Messrs. Parr and Tyack have quite a large quantity of ore on hand, but the trouble is to get it to the mill. They have not run the mill on their own ore since last November, and when they start up they expect to continue for some time.

Nevada.

THE IDAHO SOLD.—*Grass Valley Union*, April 29: Negotiations have been going on for some time between the Idaho and Maryland mining companies relative to the sale of the Idaho to the owners of the Maryland. It is known that arrangements have at last been completed which are satisfactory to all parties, and that the Idaho is now to become the property of the owners of the Maryland mine. A joint meeting was held to-day for the purpose of settling the matter, and the street talk has centered on that subject since the *Union*, announcing the meeting to be held to-day, was circulated this morning. Groups of men could be seen on the street corners discussing the probable arrangements to be made and stating the benefits to be derived from the different results. The meeting was held this morning and conclusions were reached regarding the affair. The stipulations of the agreement are as follows: The Idaho has agreed to sell and the Maryland to buy everything connected with the property known as the Idaho mine, which consists of the mill, water rights, ditches, pipe lines, reservoirs and all the lands of the Idaho company. All the supplies that are now on hand are also included in the contract. The two mines are to be worked as one, and will be under the efficient superintendency of Mr. Eugene C. Creller, who will represent the interest of the Idaho company. The interest of the Maryland company will be represented by Victor I. Dorsey, youngest son of Mr. S. P. Dorsey, the chief owner of the Maryland mining property. In regard to the payment, the price paid for the property is not known, but the Idaho company will receive nine-tenths of the net proceeds of the mine until the whole amount is fully paid. The mill will be started again and run to its fullest capacity. The mine will also employ a number of men other than those now employed, which will greatly add to the life of the city. This settles and sets at rest the agitation that has been ferment in the minds of most of the people of the city and county for the past year. The Idaho is the deepest gold mine in the world, and has turned out many millions of dollars to the stockholders and community. Mr. Edward Coleman was elected superintendent of the Idaho mine when it was in its infancy, and continued to superintend until about a month ago, when he resigned the office and Mr. Eugene C. Creller was elected to fill the vacancy. Mr. Creller is at present the superintendent, and will continue to be for some time. He has been connected with the mine for a score of years, and is fully competent to take the management in his hands and assume control of the property. The mine will be started on Monday, May 1st, under the new management, when the work will be commenced in dead earnest. The articles of agreement have been signed, and everything is now ready to begin operations in full blast.

A REVIVAL AROUND NEVADA CITY.—*Transcript*, April 29: "About a year or a year and a half ago it was almost a daily occurrence that we took down to Colfax large quantities of household furniture, which was being shipped to various parts of the State by parties who had left Nevada City and located elsewhere," said a railroad man to the *Transcript* reporter yesterday. "But now the reverse is the case. During the past five or six months more people have brought their furniture here than would offset all that was shipped away." At the time referred to by the railroad man, mine after mine had been closed down and there were but three or four in operation—that is, that gave employment to any great number of men. Then there were 40 or 50 vacant houses, and it looked as if 40 or 50 more would be added to the number. Since then about a dozen mines have been started up and now there is not a vacant house within a radius of a mile or so of town. Parties are talking of building new houses, and before the summer is over the number of dwellings will be increased materially. Since the time referred to a number of quartz mines have been started up and rich gravel mines have been opened, thus giving employment to four or five hundred more men than have been employed in the district for many years previous. Negotiations are going on as fast as possible to open many more new mines, and the indications are very strong that several hundred more men will be able to get employment within a very few months. The outlook for the opening of new mines in this section was never better than at the present time. The old quartz mines that are being operated in this immediate vicinity are employing a larger number of men than for many years before, and these mines, or most of them are looking better than for a long time. The gravel mines, which are now rapidly coming to the front, will astonish not only our own people but mining men abroad as to their richness. The business men now know that they are in the rich gravel channels, and it is predicted that before another year not far from a thousand men will be employed on the ridge from this city to Washington. The recent rich strike in the Harmony mine gives the strongest encouragement to all the companies on the ridge, and to this may be added the further fact that rich gravel has been found in the Utah drift mine, about a mile and a half from the Central House, towards the Yuba. The Italians who own the mine are said to be making big money, much of the gold found being coarse and nuggety. Near the Utah are situated the Filibuster and the Lupene, the latter claim being owned by Nevada City and Grass Valley parties. Enough

is now known of the quartz and gravel mines to show that they will be lasting for years and years to come. In a very short time there will be a genuine boom in the Willow Valley district, two miles from town, as more development work has been done in that district than most people hereabouts are aware of. Since the grand development in the Federal Loan, parties have been at work quietly and it is said on good authority that three good mines can now be shown which bid fair to equal the above-named mine. At Canada Hill, the Mayflower mine, the Sharpe & Nivene and others are looking well, and prospecting in that district is quite lively. The dark days of Nevada City have passed and bright ones will be its lot now for the next decade.

OLD ORLEANS MINE.—*Grass Valley Union*, April 26: This mine, which has lain idle for many years, has lately been worked by Abe Powning and several others, and they are taking out some fair looking ore. The old Orleans mine, which is a continuation of the Empire, is down to a depth of 108 feet. From this level they have run a drift, 150 feet in length, and struck a vein of ore which, though very small, is of a good quality. The rock will pay from \$50 to \$90 a ton. Twelve men are at work and should the vein widen out they will have a good paying mine.

MILL LEASED.—*Grass Valley Telegraph*, April 26: Mr. Alf. Tregidgo has leased the Larimer mill and will begin putting it in repair immediately. The mill, and also the Rogers mill, owned by Mr. Tregidgo, will soon be running on the ore from the Massachusetts Hill dump. There is an immense amount of ore on the dump and it is thought that there is a good profit to be made in screening the rock and putting it through the mill. For years it has been the habit of specimen hunters to visit the prize pile of rock, after a rain, and look for specimens, and many very rich pieces of ore have been found on the dump. There will be much money gleaned from the crushings of the dumps on Massachusetts Hill.

San Bernardino.

THE DESERT COUNTRY.—*Needles Eye*, April 29: The desert country is at last to be the gold-producing section of the State. The mines are far richer than any of the blue gravel diggings to the north, and as soon as water can be obtained the thousands of acres of placer ground in the north end of the mountains will be worked at a great profit. The desert country is spotted over with placer ground that some day will produce immense wealth. Hon. P. F. Collins has made an important discovery of gold ore on the old Government road, eight miles west of Fort Mojave. The ledge is six feet in width, and a sample from the entire vein gave a result of \$80 per ton gold. The ore is heavily impregnated with iron and is free milling. For years the ledge has been traveled over, but no one had the faintest idea that it contained the precious metals. Should development prove the vein as rich as the surface promises, Mr. Collins will indeed have a bonanza. Reports from the new town of Vanderbilt seem to be giving the boys around town the mining fever. There are many miners and prospectors in and around Cosman Springs and many mines have been located and are being worked. It is probable that this claim will cause quite a stir in mining circles within the next few months. Easum & Longstreet have a splendid prospect at a place north of Vanderbilt known as Cosman Springs. Mr. Easum is foreman of the Gold Bronze at Vanderbilt and is a first-class miner. Longstreet is an old-time prospector. Considerable work will be done on the property this summer and fall.

Shasta.

LOWER SPRINGS.—*Cor. Shasta Courier*, April 29: Times are lively up here. The quartz miner and pocket hunter are busy nowadays. Placer mining is nearly ended for this season and must soon give way to its stronger brother. We miners feel confident that we will open up some good-paying mines this coming summer. Several good prospects are lying idle at the present time on account of too much water. As soon as the ground dries out work will be resumed upon them. Men whose ledges are so situated as to be worked by tunnels are to be congratulated. T. Spragins has his tunnel on the Sally Ann mine in some 17 feet. The ledge is 15 inches wide, in decomposed quartz. Mr. Spragins has made as high as \$5 a day rocking the ore as it came from the tunnel, and would be working it at the present time only he stopped to enlarge his dwelling, which is situated where old Virginia town used to stand. A. J. Tilton panned out a nugget weighing \$14 last week. B. Peterson is working below Miller's ranch and is getting some good prospects. J. H. Wiser has located the old Mascot claim. He has found large quantities of rich float below the ledge on a flat that was immensely rich in early days. He intends to develop the claim and thinks it will prove a bonanza. He also owns, in company with Sheriff Ross, a valuable mine near Deakin & Taylor's ranch. The ledge is eight feet wide and milled \$16 a ton from wall to wall. They have a tunnel started that will tap the ledge 90 feet deep. In driving the tunnel ahead they have encountered seams that give astonishing prospects when sampled with a pan. Joseph Penrose was working on his tunnel last week. He drove ahead ten feet. The ledge is getting larger and gives a fair prospect with a pan. The owners of the Bull's Gulch mine will resume operations as soon as the water drains away. Five tons of ore taken out of a 15-inch vein in bottom of shaft milled \$20 a ton in free gold at Sonoma's. Some flattering prospects were discovered on the old Hargrave mine a few days ago. Sonoma is driving his tunnel ahead. The rock is getting softer and works far better than it did at the start. The tunnel is in over 300 feet. I am informed that Mr.

Somonia intends to erect a hydraulic on the mine to strip the ledge—a good scheme, as water can be obtained from the Gold Hill ditch, which runs high above the claim. Should he carry his plan into effect, it will live times up considerable. The Don't Bother Me claim is the best in the camp. The writer, in company with the owner, Mr. J. C. Frick, went to see the claim some time ago. The ledge runs east and west. A tunnel has been run in on the ledge for nearly 200 feet, showing a well-defined ledge of rich ore, two feet wide, that averages one ounce to the ton in free gold. Many years ago Spaniards worked the mine with a Mexican arrastre, which still stands on the claim. Trees that measure eight inches in diameter have grown up in its bed, which goes to prove it was worked quite a long time ago. Mr. Frick has panned out as high as \$2 to a pan where they dumped the ore before charging the arrastre, and has frequently found lovely specimens in their old workings. The Deakin & Taylor mines are still under Mr. Frick's management. It is reported that they are going to erect a mill. Mr. Frick has sufficient ore in sight to justify such an enterprise.

Trinity.

NEW RIVER.—*Trinity Journal*, April 29: Everybody is at work, and prospects look good for the summer. There is a new sort of mining started up in the way of slicing the dumps from some of the rich mines here wherever water can be got on to them. Ladd & Clements last season, in about two months' run, cleaned up over \$2000. Miller & Sone have put water on the Sherwood mine, and the other day made a clean-up, after ten days' run with two men, of \$200. Yocom & Son have about completed a ditch for the purpose of bringing water on to the Hard Tack dump. Ladd & Clements will start up the Hard Tack mine soon with a good force of men, and will no doubt do well, as that mine has produced some of the highest-grade ore in camp.

BRO BAR.—Everything down this way is looking favorable again. The mines are running at full blast, and are prospecting quite well. Harrington & Gore are cutting a bedrock ditch through which they are going to tap the bar. The Chinese at Price's claim are supposed to be doing well.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, Apr. 29: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 16th floors, above the sill floor of this level. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stopes, eight floors up in the npraise, No. 6 carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the north-west drift. From the drift run west from these north workings, 27 feet up, the npraise, started 50 feet in from the mouth of the drift, has been carried up 13 feet; total height, 60 feet; the top being in a quartz formation carrying a low assay value. Have continued to stope out ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. From the end of the drift run south from near the bottom of that winze (52 feet down) an east crosscut has been advanced 37 feet in porphyry and quartz of low assay value. Have extracted during the week from all parts of the mine 605 cars of ore, about 640 tons. Shipped to Morgan mill 671 100-2000 tons of ore. Average assay value, per railroad car samples, \$31.34. The assay value per battery sample of all the ore worked at that mill during the week (655 tons), was \$27.03 per ton. Shipped bullion to Carson Mint, assay value, \$12,309.06.

OPRER.—500 level—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level—The west crosscut started from the bottom of the winze, sunk 52 feet below the sill floor of this level, has been advanced 15 feet in a porphyry, clay and quartz formation which carries a low assay value.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 21 feet; total length, 173 feet, continuing in porphyry formation carrying clay separations.

UTAH.—340 level—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 15 feet; total length, 122 feet; in quartzite and clay formation of very low assay value.

SIEBNA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 15 feet, making the total length 312 feet; the face is in hard porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 21 feet, making the total distance west of the joint shaft 3143 feet; the face is in porphyry and streaks of clay.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 21 feet, making the total distance west of the shaft 3143 feet; the face is in porphyry and streaks of clay.

ANDES.—On 420 level from north drift from east crosscut No. 1 north, a west crosscut has been advanced 14 feet. This crosscut is all in quartz of very low assay value.

BEST & BLOCHER.—200 level—At a point in northwest drift, 230 feet from our south line, started west crosscut No. 2 and advanced same 22 feet, passing through porphyry and quartz; total length, 42 feet. 900 level—At a point southwest drift 112 feet from west crosscut

No. 3, started west crosscut No. 4, and extended same a distance of 12 feet; face in hard porphyry. Sinto tunnel level—We are now running an east crosscut to make connection between the Gould & Curry winze, which was carried down by them from the 1600 level, and the joint north drift.

GOULD & CURRY.—200 level—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been advanced 11 feet; total length, 446 feet; face in hard porphyry. Sinto tunnel level—On level we are now running an east crosscut to make connection between our winze from the 1600 level and the joint north drift.

HALE & NORCROSS.—1800 level—Advanced west crosscut on our south boundary 15 feet; total length, 125 feet; face of this crosscut has reached the west wall of this ledge. Have discontinued work in the face and are now cutting out a place in this crosscut at a point 60 feet back from the face, for an nraise in some favorable-looking quartz. Main shaft—At 1300 level we have been doing necessary work preparatory to retimbering between the 1300 and 1100 levels, and are repairing main incline between the 1300 and 1400 levels.

CHOLLAR.—The east crosscut near the south line, 930 level, is out 146 feet; face is in porphyry and seams of quartz.

POTOSI.—The east crosscut No. 3, 850 level, is out 375 feet; face is in porphyry and seams of quartz. Have started a drift north from the last-named crosscut, at a point 204 feet east of the footwall, following a clay wall and streak of quartz giving low assays; drift is out 10 feet. The nraise 75 feet south of Potosi winze, 930 level, is up 35 feet; formation in the top is porphyry and streaks of quartz. North drift 200 feet east of Potosi winze, 930 level, is out 16 feet; face shows 15 inches of quartz of low grade. The west crosscut from north drift, 930 level, is out 80 feet; face is in hard porphyry. Have started an nraise 80 feet north of top of raise, 1000 level, which is up 25 feet; top is in porphyry and quartz. On the same level, 20 feet south of top of raise, from 1100 level, have started an nraise which is up 12 feet; top shows five feet of quartz that gives fair assays. Extracted and sent to mill the past week 4983 tons from the 550, 930, 1000 and 1150 levels. Milled during the week 525 tons. On hand at mill, 101 tons and 250 pounds. Average battery assays, \$25.12; average car sample assays, \$29.32. Shipped to the U. S. Mint, Carson, 390 pounds of crude bullion.

BULLION.—Are yet engaged in retimbering and repairing the Ward shaft, which is not yet completed.

APEX.—Have finished timbering and begun to sink the winze, making total depth 55 feet; the ledge is promising.

EXCHERQUE.—Have not yet completed retimbering and repairing the Ward shaft.

KENTUCK.—We continue to extract from two

to three tons of ore per day from the 160 level of the average value of \$34 per ton. On the 1100 level we have been timbering and preparing for regular extraction of ore for the mill.

ALPHA.—Are yet engaged retimbering the Ward shaft.

WARD SHAFT.—Are retimbering the shaft 20 feet from the surface.

OCCIDENTAL.—The main north drift on the 750 level has been extended 12 feet; total length, 743 feet; face is in hard porphyry. The nraise above No. 2 winze in south drift, 750 level, is up 136 feet, and continues in ore of fair grade. The Zedig drift has been advanced 10 feet in hard porphyry; total length, 941 feet.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 30 feet; the face is in quartz, some of which gives fair assays. The south drift from No. 4 west crosscut, 800 level, is in a distance of 48 feet; formation, soft porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 7 feet during the past week, making the total distance from north line, 103 feet, the face is in hard porphyry.

BRITISH COLUMBIA.

ANOTHER PROMISING PLACER.—Nelson Miner, April 22: The Rip Van Winkle placer mine near Lytton, will probably be one of the next great mining excitements in this country. The mine is equipped and in working order. Mr. J. B. Hobson, a placer miner of nearly thirty years' experience in California, is in charge, and those who should know challenge you to find a better man for his work in the province. All that the company is waiting for now is for the break up of winter, and already warm winds are blowing and soft rains falling. At the end of this month there will be a great camp of interested ones in this placer watching the first fortnight's work, and waiting for the first wash-up. Public opinion says that the mine is a sure thing already, and shares that were bought last summer at \$1000 are sought eagerly but vainly at \$4500 to-day. The men who are waiting for that first wash-up don't care to "stand on velvet." When those boxes are opened up they expect to see something which will practically guarantee them several hundred per cent per annum on their investment. "Whole hog or non" is their motto, and they, together with "the good old Jim," who led most of them into this good thing, deserve all the luck in the world.

Complimentary Samples.

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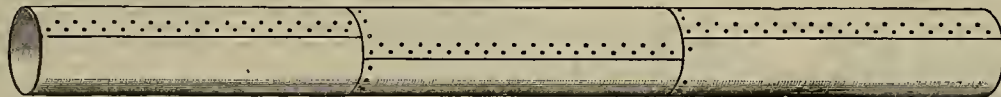
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Market Reports.

The Markets.

SAN FRANCISCO, May 4, 1893.

Silver in April.

The following shows the daily price of silver in New York and London during the month of April:

Date.	New York.	London.
1.....	83c	Holiday
2.....	83	Holiday
3.....	83	38 1/2
4.....	82 1/2	38
5.....	82 1/2	37 1/2
6.....	82 1/2	38
7.....	82 1/2	38
8.....	82 1/2	38
9.....	82 1/2	38
10.....	82 1/2	38
11.....	82 1/2	38
12.....	82 1/2	38
13.....	82 1/2	37 15-16
14.....	82 1/2	37 15-16
15.....	82 1/2	38
16.....	83	38
17.....	83	38
18.....	83	38
19.....	83 1/2	38
20.....	83	38
21.....	83	38
22.....	83	38
23.....	83	38
24.....	83	38
25.....	83	38
26.....	83	38 1-16
27.....	Holiday	38 1/2
28.....	83 1/2	38 1/2
29.....	83 1/2	38 5-16

The London quotations are per ounce 925 fine and 1000 fine in New York. The highest and lowest prices for the month were as follows:

	London.	New York.
Highest.....	38 5-16d	83 1/2c
Lowest.....	37 7/8	82 1/2
Difference.....	7-16	1 1/2c

In March the difference between the highest and lowest London prices was 13-16d, and 1 1/2c in New York.

In March the London market opened at 38 1/4d and closed at 38 1/4d. The highest price during that month was 38 1/4d. The New York market opened at 83 1/2c and closed at 83 1/2c, the highest being 83 1/2c.

The Metals.—No material changes are to be noted in metals during the week. Copper is easier. Lead and tin are both steady.

Eastern Silver Markets.

NEW YORK, May 4.—Following are the closing prices for the week:

	Silver in—	London.	N. Y.	Copper.	Lead.	Tin.
Thursday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Friday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Saturday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Sunday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Monday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Tuesday.....	38 1/2	83 1/2	11 00	4 05	20 65	
Wednesday.....	38 1/2	83 1/2	11 00	4 05	20 65	

Mining Share Market.

The stock market continues active so that it looks as if the long expected revival in Comstock's speculations had at last arrived. Prices are much higher all along the line, some of the advances being quite marked.

Following are the regular monthly statements:

ARIZONA MINES.	Dr.	Cr.
Crocker.....	\$ 799 23	
Peer.....	642 77	
Peerless.....	1,391 55	
Weldon.....	665 49	
RODIE MINES.		
Bodie.....	13,451 83	
Bulwer.....	\$ 1,664 43	
Mono.....	5,984 93	
Summit.....	2,014 93	
Syndicate.....	1,731 71	
Standard Con.....	38,181 45	

TUSCARORA MINES.	Dr.	Cr.
Commonwealth.....	26 776 16	
Grand Prize.....	277 00	
Nevada Queen.....		1,372 36
North Belle Isle.....	9 071 71	
Navajo.....	8,820 34	
Del Monte.....	24,315 25	
Belle Isle.....	5 579 71	

COMSTOCK MINES.	Dr.	Cr.
Alpha.....	2,846 94	
Alta.....	19,791 58	
Andes.....	19,007 76	
Belcher.....	22,247 53	
Best & Belcher.....	5,602 95	
Bullion.....	262 21	
Caledonia.....	9,656 68	
Challenge.....	3,749 72	
Collar.....	16,543 84	
Con. Imperial.....	2,267 80	
Confidence.....	58 60	
Con. Cal & Va.....	58,494 30	
Crown Point.....	9,675 56	
Exchequer.....	5,343 23	
East Sierra Nevada.....	5 10	
Gould & Curry.....	1,896 24	
Hale & Norcross.....	7,959 48	
Julia.....	2,023 35	
Justice.....	2,275 03	
Kentuck.....	595 41	
Lady Washington.....	3,967 62	
Mexican.....	17,713 07	
Ophir.....	18,819 18	
Overman.....	9,838 81	
Occidental.....	3,415 38	
Potosi.....	24,295 10	
Savage.....	8,635 48	
Scorpion.....	2,155 63	
Seg. Belcher.....	2,278 91	
Silver Hill.....	1,813 58	
Sierra Nevada.....	19,009 87	
Union.....	18,418 96	
Utah.....	4,241 04	

NOTE.—Con. Cal. & Va. has \$12,309.86 in bullion, with further shipments to arrive. Gould & Curry has \$26,482.25 due on assessment.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING APRIL 25, 1893.

496,293.—WHEEL FOR SINGLE-TRACK RAILROAD—J. Burt, Tres Pinos, Cal.	
496,187.—IRRIGATING SYSTEM—B. O. Clark, Pasadena, Cal.	
496,188.—ELEVATED CABLE RAILWAY—L. F. Cook, Tacoma, Wash.	
496,189.—ELEVATED CABLE RAILWAY—L. F. Cook, Tacoma, Wash.	
496,046.—CREMATORY—D. F. Donegan, Los Angeles, Cal.	
496,248.—CHIN REST FOR HORSES—G. T. Duncan, Tacoma, Wash.	
496,301.—TAP AND FAUCET—Mattie Z. Farrington, S. F.	
496,355.—VEHICLE WRENCH—D. H. Fansl, Stockton, Cal.	
496,118.—DOUBLE-LAP PIPE—C. S. Hamlin, Los Angeles, Cal.	
496,311.—HARVESTER—Benj. Holt, Stockton, Cal.	
496,262.—LUBRICATOR—B. F. Howard, Sheep Ranch, Cal.	
495,979.—PIANO-FORTE ATTACHMENT—F. W. Kringel, Los Angeles, Cal.	
496,319.—TRACE BOOKLE—O. Mallory, Auburn, Cal.	
496,269.—PENCIL HOLDER AND SHARPENER—R. Mazza, San Leandro, Cal.	
496,270.—CAR VENTILATOR—T. L. Merrill, Oakland, Cal.	
495,991.—PRESERVING TIMBER—P. Murray, Seattle, Wash.	
496,325.—AXLE LUBRICATOR—A. W. Sanborn, S. F.	
496,235.—SMELTING FURNACE—Smith & Brewer, S. F.	
496,238.—MUSICAL INSTRUMENT—A. P. Venen, Seattle, Wash.	
496,022.—STONE-MOLDING MACHINE—W. B. Ward, Los Angeles, Cal.	
496,239.—WATER GATE—C. H. Watson, Riverside, Cal.	

The following brief list by telegram, for May 2, will appear more complete on receipt of mail advices:

California—Daniel Best, San Leandro, two patents, gas engine motor for cars and gas engine igniter; Ephraim Chaquette, San Francisco, bolt or rod cutter; Jabez F. Cowdery, San Francisco, fire extinguisher for railway car heaters and lights; William A. Duesbury, San Francisco, label for Elmore, Biggs, pump; Stephen C. Houghton, San Francisco, fare register; Augustus Knudsen, San Francisco, steam engine; Isaac W. Lord, Cucamonga, fruit picker; Joseph P. Magney and R. Lietz, San Francisco, knob attachment; John R. McCurdy, Los Angeles, stand attachment for bicycles; Axel Wernsberg and J. G. Egan, San Diego, running gear; Sanders, Portland, electrode for arc lamps and electric arc lamp; Alfred C. Sanford, The Dalles, castor axle and wheel.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, May 4, 1893.

9:30 A. M. SESSION.

100 Alta.....	200 200	25
700 Andes.....	500 550 Mexican.....	2 05
600 Belcher.....	1 35 25	2 10
100 Best & B.....	1 40 100 Ophir.....	3 05
500 Bodie.....	1 70 50	3 10
150 Bodie.....	400 100 Peerless.....	1 0c
400 Bullion.....	500 200 Overman.....	3 5c
300 Chollar.....	1 15 50	4 0c
400 Con. Cal. & Va.....	1 20 500 Potosi.....	2 50
700 Confidence.....	2 75 100 Savage.....	1 25
100 Exchequer.....	1 65 100 Scorpion.....	1 0c
100 Gould & Curry.....	1 50 400 S. B. & M.....	2 5c
300 Crown Point.....	1 00 500 Sierra Nevada.....	1 50
500 Gould & Curry.....	9 00 100 Union.....	1 30
550 Hale & Norcross.....	850 450 Utah.....	2 5c
550 Hale & Norcross.....	1 15 200 Yellow Jacket.....	1 20
60 Kentuck.....	1 20 5	1 05
100 Kentuck.....	30c	

2:30 P. M. SESSION.

100 Alta.....	150 400 Mexican.....	2 15
1250 Belcher.....	1 70 150 Mono.....	2 5c
200 Best & B.....	1 50 50 Ophir.....	3 15
100 Bodie.....	1 75 5	3 05
100 Bodie.....	3 00 100	3 20
200 Bullion.....	500 200 Overman.....	4 0c
1250 Chollar.....	1 20 500 Potosi.....	2 50
150.....	1 15 150 Savage.....	1 25
650 Crown Point.....	1 15 500 S. B. & M.....	3 0c
100 Con. Cal. & Va.....	2 80 400 Sierra Nevada.....	1 55
100 Gould & Curry.....	9 00 100 Union.....	1 30
550 Hale & Norcross.....	850 450 Utah.....	2 5c
550 Hale & Norcross.....	1 15 200 Yellow Jacket.....	1 20
60 Kentuck.....	1 20 5	1 05
100 Kentuck.....	30c	

NOTICE OF ASSESSMENT.

Gould and Curry Silver Mining Company. Location of principal place of business, San Francisco, California. Location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 11th day of April, 1893, an assessment (No. 71) of Twenty-five Cents (25c) per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 69 Nevada Block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 6th day of June, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.

By order of the Board of Trustees.

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ASSESSMENTS.

COMPANY AND LOCATION.	Nr. AMT. LEVIED.	DELINQ. TAND SALE.	SECRETARY.
Alta M Co, Nev.....	43.....	April 25, May 31, June 21.....	L Osborn, 309 Montgomery
Belle Isle M Co, Nev.....	18.....	March 24, May 1, May 25.....	J W Pew, 310 Pine
Bullion M Co, Nevada.....	41.....	April 13, May 17, June 7.....	R R Grayson, 331 Pine
Chollar M Co, Nevada.....	54.....	April 17, May 23, June 13.....	C E Elliot, 339 Montgomery
Cons Imperial M Co, Nevada.....	35.....	March 20, April 26, May 17.....	O L McCoy, Mills Building
Cone St, Gothard G M Co, California.....	7.....	Feb 9, March 17, May 6.....	T Wetzel, 310 Sansome
Eveling Star M Co, California.....	9.....	April 1, May 15, June 8.....	J J Scoville, 320 Sansome
Gould & Curry M Co, Nev.....	21.....	March 9, April 24, May 16.....	D M Kent, 330 Pine
Gray Eagle M Co, Cal.....	32.....	April 10, May 15, June 6.....	A D Durlow, 339 Montgomery
Jackson M Co, Nev.....	14.....	April 5, May 10, May 30.....	O O Harvey, 303 California
Jackrabbit M. & M. Co, Nevada.....	3.....	March 28, April 28, May 17.....	O R Jones, 320 Pine
Lady Washington Cons M Co, Nevada.....	9.....	March 27, May 2, May 22.....	T Wetzel, 320 Sansome
Mexican M Co, Nevada.....	4.....	April 18, May 23, June 13.....	L Osborn, 309 Montgomery
Navajo M Co, Nev.....	25.....	March 10, April 20, May 11.....	D M Kent, 330 Pine
North Belle Isle M Co, Nevada.....	23.....	April 17, May 23, June 21.....	J W Pew, 310 Pine
Occidental M Co, Nevada.....	12.....	March 17, April 20, May 11.....	A K Durlow, 309 Montgomery
Overman M Co, Nevada.....	67.....	April 23, June 2, June 23.....	G D Edwards, 414 California
Pine Hill M Co, Cal.....	2.....	March 22, April 27, May 24.....	A H Hare, Pier 5, Stewart
Savage M Co, Nevada.....	80.....	March 16, April 19, May 9.....	E B Holmes, 309 Montgomery
Slackpou Cons M Co, California.....	8.....	April 28, June 1, June 23.....	E F Stone, 305 Pine
Union Cons M Co, Nevada.....	47.....	March 15, April 21, May 11.....	O O Harvey, 335 California
Utah Cop M Co, Nev.....	17.....	March 24, April 26, May 15.....	A W Haves, 309 Montgomery
Yellow Jacket M Co, Nev.....	54.....	March 10, April 14, May 19.....	W H Blauvelt, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Gover M Co.....	Annual.....	R Dohle, 15 Fremont.....	May 9
Morgan M Co, California.....	Annual.....	L C Brees, 230 Montgomery.....	May 6
Scorpion M Co, Nev.....	Annual.....	G R Spinner, 310 Pine.....	May 8

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.....	5.....	L Osborn, 309 Montgomery.....	Oct 20
Champion M Co, California.....	15.....	T Wetzel, 310 Pine.....	April 17
Cons New York M Co, Nevada.....	10.....	O E Elliott, 339 Montgomery.....	Feb 15
Great Western Quicksilver M Co.....	25.....	A Halsey, 339 Montgomery.....	Oct 8
Mayflower Gravel M Co, California.....	25.....	D M Kent, 330 Pine.....	March 20
Pacific Coast Borax Co, California.....	1 00.....	A E Clough, 230 Montgomery.....	Jan 10
Standard Cons M Co, California.....	10.....	J W Pew, 310 Pine.....	Dec 23

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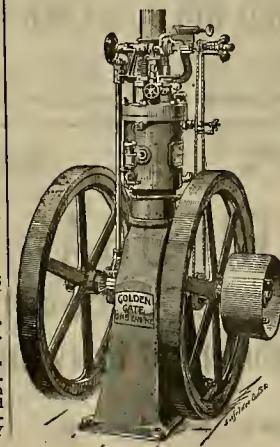
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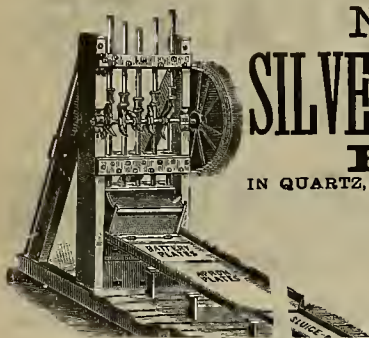
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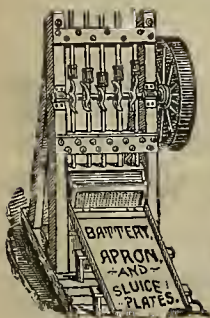
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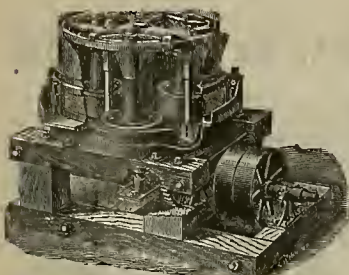
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VOL. LXVI. — Number 19.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 13, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Concentrating and Concentrators.

The mechanical concentration of ores is based entirely on the differences of the specific gravity of their component parts; and one of the most important points to be considered and accomplished in the treatment of gold-bearing ores is, "the nearest approach to a separation of the silicious and gangue matter from the residual mineralogical contents of the ores," whatever difference of specific gravity may exist.

Many devices have been conceived, invented and introduced to the notice of mining men for the purpose of effecting the proper separation of the pyritous matters contained within the ores from the accompanying gangue, and we here present an electro illustrating the recently improved form of "Triumph" concentrator, which shows the improvements which have been introduced into its construction, by which many advantages are gained over other forms of vanners, vanning machines or concentrators.

These advantages are obtained by reason of the fact, as will be observed from the cut, that crank-shaft is now placed and fitted at the head of the concentrator, clear of the belt and in direct view of the operator or attendant. This, of course, greatly facilitates the oiling of the bearings of the shaft and connecting-rod and precludes the possibility of any sand or detritus passing over the belt from reaching or getting into the bearings.

The forms of the bearings and as well of the connecting-rod brasses have also been very much improved, making them stronger, simpler and more easy of adjustment. Important improvements have also been made in the feed-screw and quadrant for regulating the belt, with the view of making all of the parts of the machine stronger, more accessible and as easy of regulation as is possible.

The Joshua Hendy Machine Works, of No. 51 Fremont street, this city, are the builders and controllers of the form, as herein presented, and have one set up ready for operation at their office; and a representative of those works informs us that they will be pleased to have mining and mill men examine the improved machine.

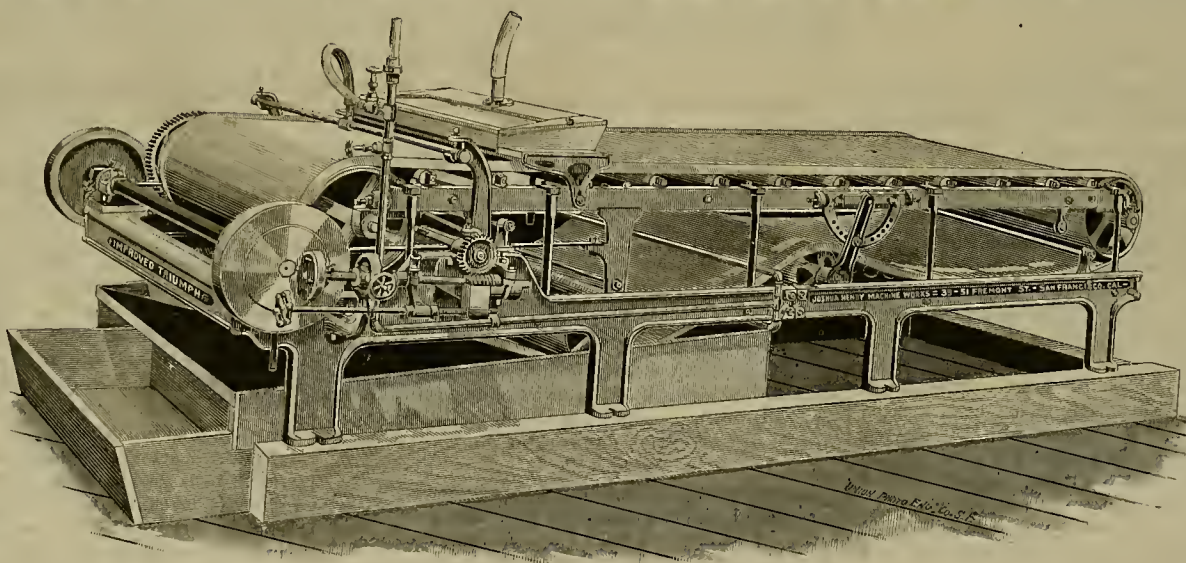
THE schooner Czarina, brings the information that some of the miners working in the Apollo mines, on Unga island, Alaska, had a disagreement among themselves and were discharged. Some of the miners left here last January on the steamer Dora, on that steamer's mid-winter trip to Alaska. The discharged miners circulated stories at Sand Point that the high grade of ore discovered a year ago at the mines had fallen off.

"THE MODERN TRAVELING CRANE" is the title of a pamphlet issued by Wm. Sellers & Co., Philadelphia. It contains a paper by Alexander E. Outerbridge Jr., which was read before the Franklin Institute. There is a great deal in this of interest to foundrymen.

California Manganese.

Manganese is a "pockety" sort of substance to mine, the deposits being irregular and not to be counted on as to extent. It is produced in this State in a small way, mainly for use in the manufacture of chlorine for the chlorination of auriferous sulphurets. The total amount of manganese produced in California up to the close of 1891 was 7144 tons. In the latter year it all came from two mines, one in Alameda and the other in San Joaquin county. The amount yielded in 1891 was 705 tons worth \$3830 or \$5.44 per ton. The general average of the 23,416 tons manganese ores produced in the United States in that year was \$10.21 per ton. There is indication of a growing scarcity in this country of high-grade ores such as are classed as manganese ores proper.

Virginia is the leading producer of manganese in the United States, yet it only produced 16,348 tons in 1891. Georgia comes second with 3575 tons, and Arkansas next



IMPROVED FORM OF "TRIUMPH" ORE CONCENTRATOR.

with 1650 tons valued at \$11 per ton. The average value of the Virginia ores was \$11.17 per ton. Most of this comes from the group of mines at Oromora. Manganese has been found in several counties of California, but the deposits are not steadily worked and little prospecting is done for the mineral. What is found is not of very high grade and its value is therefore low as compared with the ores of other States.

EX-SENATOR O. W. CROSS and Hon. James A. Hall of Santa Cruz, who have been conducting a law partnership in San Francisco for some years, and are well known in mining litigation, have organized a new law firm by taking into partnership Senator Tirey L. Ford of Downieville and Hon. Frank P. Kelly, ex-District Attorney of Los Angeles county. Senator Ford, however, will continue to reside at Downieville, and will attend to all business the firm may have in the mining counties.

THE next western gathering will be the western slope congress at Montrose June 21. This will be followed by the southwestern miners' silver congress at Silver City, N. M., on July 4th; the mining congress at Salt Lake city on September 11th, and the irrigation congress at Los Angeles, Cal., on October 10th. All of these gatherings will be of large influence in advancing western interests and concentrating western opinion.

The State Debris Commission.

It is to be hoped that Governor Markham will, in his selection of a State Debris Commission under the Ford Act, exercise great care and discretion. Although the law calls for a "competent civil engineer," a large proportion of the civil engineers would be of small service, simply because they lack the technical knowledge of mining matters that this official should have. As far as mere engineering knowledge is concerned, such as that required for the construction of dams, and to make calculations for flow of water, etc., the Government Debris Commission are perfectly well equipped and scarcely need any consultation and advice with a State Debris Commissioner. This latter official is to examine and pass upon the merits of works for the impounding of mining debris, or rather upon the plans and specifications for their construction. There is something needed in all this beyond the mere knowledge of how to build a dam.

A civil and mining engineer should be selected for this position. Any man filling this office without some intimate knowledge of hydraulic mining would be mainly interested in drawing his salary, and would be of no use to the U. S. Engineers forming the Government Debris Commission.

If the Governor of the State will appoint as Commissioner some expert engineer who is familiar with the conditions relating to the hydraulic mining industry, the two Commissions will work in harmony

and accomplish a great deal more than if the man appointed has limited his experience to some other branch of engineering. Mere politics should not count in this appointment. There are several competent men who would accept the position and do their duty in a satisfactory manner. The Government Commission will need advice and assistance in the mining features, and, as mining debris and mining operations form the basis of all their work, the State ought to provide the mining engineer.

Some of the valley counties are already asking that the Commissioner should be appointed from their midst, but putting an anti-debris man in as a debris commissioner seems absurd, to say the least. We need a man with mining experience and knowledge to fill the position satisfactorily. This work is to be mainly advisory in any event and he ought to be expert enough to give advice that will be of some value. The term of office is only four years for this Commissioner and it would take ordinary civil engineers that long to become expert in the mining features. Governor Markham has by words and acts shown his friendship to the miners of this State, and he can still further add to their gratitude by appointing as Debris Commissioner a skilled, expert and conservative mining engineer.

THE export of California wines by sea in April were 1474 cases and 354,920 gallons, valued at \$172,133.

MINING AND SCIENTIFIC PRESS.

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W. B. EWER, }
 CHAS. G. YALE, } EDITORS

Our latest forms go to press on Thursday evening.

Entered at the U. S. Postoffice as Second-Class Mail Matter.

San Francisco, May 13, 1893.

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Comment.

The newspapers have stated that the Haywards electric road will run freight cars at night to bring the fruit products of Alameda county to market. This the company deny, but it would seem a sensible proposition and one which might be profitable. In cities like Oakland, San Jose, Fresno and other places with a surrounding agricultural population, where electric roads run for miles out into the country, the utilization of the roads for freight at night would seem entirely feasible. It would certainly aid in the development of the outside tracts. Generally speaking, our country roads are poor, and great expense is entailed on the producers in bringing their products to the town or railroad. If five or ten miles of team haulage could be saved it would be quite an item. In such a road as will run from Santa Clara to Saratoga, for instance, there ought to be more in the freight than in the passenger business. The Haywards road from Oakland is about 13 miles long and runs through a rich fruit and vegetable region. If freight was carried on this road at certain hours, the farmers for miles on both sides would have a great advantage in marketing their products rapidly.

Californians have rather had the conceit taken out of them by the comments which come from Chicago relative to the State's exhibits at the World's Fair. It was imagined that because California had put up more money for the fair than any other State, except Illinois and New York, its exhibit would excel the others. With \$600,000 at command, a magnificent show should have been made, but thus far it seems to be unsatisfactory. The newspaper correspondents accord the exhibit no praise, and those persons who have returned confess they were ashamed of the backwardness of affairs in the California building. A palm tree and the figure of a horse made in prunes seem to have been the only things which have attracted special attention. Other States excel us in horticultural and mining displays, our own two specialties. We expected great praise, but thus far have received mainly criticism, even from our own people. All this is greatly to be regretted, and it is plain that there has been blundering and incapacity on the part of some in charge of the affair. It will doubtless be found that too much money has been paid out for salaries and not enough in the practical features of collecting the products to be exhibited. We know this to be the case in the mining department and will not be surprised to hear the same complaint in connection with other divisions. It is not too late, however, to remedy defects, and the criticisms made public should have an immediate beneficial effect. Already the officials of the State Mining Bureau have sent an additional supply of

the ores from which gold is obtained, because one of the correspondents said there were none to speak of in the California mineral exhibit. But the Mining Bureau is not responsible for any defects. Part of its collection forms the bulk of the California mineral display at the fair. Had the commissioners and superintendent showed ordinary energy and activity, we ought to have made a more complete mineral display than any State in the Union.

The San Francisco Board of Supervisors now in office seem to be trying to educate the street contractors up to the idea that they must carry out the specifications and do the work as agreed upon. Men who have been taking bitumen-pavement contracts for 17 and 18 cents a cubic foot, when the actual cost for proper work was 23 cents, will have to quit their former customs. The Street Superintendent no longer looks at the surface of a completed street before accepting it. The Street Committee go with him and have men dig up two feet square of the bitumen, and then dig into the concrete foundation. If it is found that there are six inches of good concrete and two inches of bitumen, the street is accepted; otherwise not. No portions of blocks or crossings will hereafter be accepted unless portions are dug up and examined. All this is a move in the right direction. The next thing to do is to enforce an ordinance against heavily-laden wagons with narrow tires, so as to save the streets when they are put in order. This is done in other cities and should be here. There is a decided tendency all over the country for better streets and better roads. The methods of making and maintaining them are well known, but the failure to apply these methods is the trouble. Our local Supervisors have started on the right track and it is to be hoped they will continue their good work.

As the big hydraulic mines in the upper portion of the State are being put in order for work under the provisions of the Caminetti Act, the Anti-Debris Association are turning their attention to the small claims in Nevada, Sierra and Plumas counties, and enjoining many which were being operated on a small scale. There are many of these little claims, owned by individuals, the work on which does little or no harm; still they are being enjoined. So, for the present, at least, the Anti-Debris Association people are getting the advantage under the operation of the new law. The miners' turn will come, however, and only a little patience is needed. When the Government Commission is organized a license to mine may be procured readily in most of these instances, and then operations may be resumed without reference to the Anti-Debris Association or "spies." Where there are a number of these smaller mines draining into one canyon or stream, a single dam, to be paid for jointly, will give all a chance to work. While, therefore, injunctions may be pretty thick just now, they will in time be dissolved and the mines be permitted to work. A license from the Government Commission, once secured, will relieve the miners from future persecution, compliance with the law being adhered to.

Some men who own a farm on the bank of the Sacramento river, above Redding, Shasta county, have rigged up a crude dredging machine and are represented as making money by getting the gold in the gravel found at the bottom of the river. A small steam engine serves to operate the dredge and the windlass for moving the boat. In some instances two men have averaged \$20 a day for a week at a time; at other times they cannot get gravel in paying quantities. In early days there were rich diggings in the many creeks emptying into the Sacramento above Redding, and there should be plenty of gold in the bed of the main stream. A new engine has been bought for the dredging boat referred to, and more systematic efforts will be made to hunt for rich spots. This is the first instance in our recollection where any profit has been made in dredging a California river bed. The plan has been tried a number of times and on a large scale, but each attempt has been a failure. While the hucksters brought up gravel, sand and rocks, the proportion of gold has been too small. However, most of the attempts have been on rivers the beds of which were covered with sand and debris from mining operations. The upper Sacramento would appear to be the best place for this kind of mining. River dredging for gold is carried on successfully in some of the Australian colonies, but, as stated, we have never made a success of it here, with the exception of the instance noted.

From several of the counties come reports of the increased interest in quartz mining this spring. A fresh impetus was to be expected this year in California because this State is the principal gold-producer of the Union, yielding annually more than four times any other one. The "black-eye" given to silver mining by the decline in value of the product has driven many out of that business who will go into gold mining. It cannot be said,

however, that many San Francisco men are making investments in these properties; the people who are doing this are from other States and are in a better position to recognize the value of our quartz properties than we are ourselves. That is, we do not properly appreciate the advantages in mining that is right at our doors; but mining men from other sections, when once they investigate, do not take long to decide. But we need capital to develop our prospects, and do not much care where it comes from, so that it does come.

Owners of "prospects" should remember that the other fellow must take some chances if he buys their claims. Therefore the prices asked ought to be less than what the whole mine is worth after it is developed. A claim may develop into a mine, and yet again it may amount to nothing more than a hole in the ground. These chances have to be taken by the man who buys a prospect and should be taken fully into consideration by those who have such claims to sell. It is foolish, therefore, to put the price of a developed claim on to what is merely a prospect. But it is doing this which keeps miners poor and keeps investors away. As there appears just now a good chance to sell "gold prospects" in this State, it is to be hoped their owners will be reasonable and not demand such exorbitant prices as to discourage the buyers.

Magnetic Separation of Ores.

Along the Rhode Island shore the iron sands of the beach are treated by passing them over magnetic separators and a small quantity of concentrated iron ore is then produced and sold. There are on the ocean beaches of this State vast quantities of magnetic iron sands, but few attempts have been made to utilize them. Some ten years or so ago smelting works for their reduction were put up at Sausalito, but the venture was not a success. At that time magnetic separation was not thought of. Magnetic separators have been in use since 1852, but it is only within late years that this system has attracted much attention. Although the forms of magnetic separators vary, they may be classed under three general heads: (1) Altering the trajectory of falling material by introducing the attraction of a magnet, to draw the magnetic portion away from the non-magnetic.

(2) Feeding the ore to a revolving drum or drums, in which is a magnet core, the shells of the drum being either of alternate magnetic and non-magnetic strips or entirely of magnetic or non-magnetic material. In some of these drums the magnet core is wound so as to exert a constant polarity, in others a series of magnets of alternate polarity compose the core, and in some, opposite drums are of opposite polarity. When two drums are used, they are placed so as to revolve toward each other, the ore passing between them, or they are arranged tandem, the drums revolving in the same direction, but sometimes at different speeds and with different degrees of magnetic force, so that the ore fed from one drum to the other receives successive treatment. Machines are also arranged with more than two drums.

(3) Belt machines in which the ore is fed to a belt or series of belts passing under or over magnets or magnetic drums, the machines working sometimes in water and sometimes dry. In some of the machines the polarity is maintained continuously by means of pole pieces; in others the material is constantly submitted to magnets of alternate polarity, the belts being placed so as to run either vertically, horizontally, or on an incline, according as the conditions require.

Of these different classes, there are now in actual operation the following: Six of Class 1, 29 of Class two, and 27 of Class 3. These are used either at the mines to enrich the ore, at steel works and rolling mills to remove the magnetic particles from slag and dirt, to separate iron ore from pottery clay or from emery—and, in one instance, iron ore occurring as a hematite with zinc ore is treated in a roasting furnace after being comminuted, and, becoming magnetic, can be separated.

Mr. John Birkinbine, in the "Mineral Resources" of the U. S. Geological Survey, states that the principal magnetic separator plants are those of Messrs. Witherhees, Sherman & Co., at Mineville, New York, who constructed the first large plant operated entirely with magnetic separators, and made a number of experiments with various machines. There are also large magnetic separating plants at the Orono mines, at Clover Hill, and at the Tilly Foster mine, near Brewster, New York; at the Magnetic Iron Ore Company's works at Little River, New York, and another at the Ogden mine, New Jersey. In addition to the extensive plant which Mr. Edison has at the Ogden mine, he also put up plants at Humboldt, Michigan, and Bechtelsville, Pennsylvania, both of which were destroyed by fire. In addition to those plants mentioned, there are smaller ones at Michigamme, Michigan, two in New Jersey, two in Pennsylvania, and one each in

Virginia and North Carolina. There is apparently a wide field for magnetic separation, and doubtless experiments will be made in California in time.

Working Comstock Mill Tailings.

The Comstock mines last year turned out 104,058 tons of ore, the gross yield or value of which was \$1,560,923. The actual cost of extracting was \$1,206,965, and transportation \$17,704. The actual cost of reduction by free milling was \$644,517, making the total cost \$1,869,188. These figures are reported by the county auditor to the State comptroller for revenue purposes. The mills worked also 27,793 tons of tailings, the gross yield of which was \$91,467. The cost of extraction was \$77,915. The profit was \$14,515. In milling the ore a larger proportion of the silver than the gold passes away in tailings. The slimes of these tailings assay in gold and silver proportionately about the same as the original ore, but the heavier sands and sulphurets contain about one part of gold to three parts of silver. The run of promiscuous slimes and tailings gives an average reduction result of 66½ per cent silver to 33½ per cent gold. The earlier ore workings were naturally experimental and unequal and the saving and working of the sandy sulphurets and slime render the expressive name of "tailings" still more so.

These figures are taken from a chapter by Alf. Doten in the latest Report of the Director of the U. S. Mint. There is no doubt that in some of the cruder experimental processes, at first adopted, a larger proportion of the precious metal contained in the ore escaped in the tailings than has since. Some, however, in the form of sandy sulphurets were caught in blanket sluices and reservoirs, but much of the richer and lighter chlorides, etc., as well as sulphurets, amalgam and quicksilver, were washed away down the Carson river. Dredging operations in the river have not paid a profit. Some large deposits and reserves of old tailings are still being worked at a profit, but quite a falling off in that industry is caused principally by a more careful and effective operation of the mills and these tailings sluices allowing but a comparatively small percentage to escape. Between 1871 and 1893 a total of 2,675,825 tons of Comstock tailings have been worked. The gross yield has been \$13,179,947; cost of extraction, reduction, etc., \$10,672,386; net yield in value for taxation, \$2,747,671; total profit, \$2,520,058.

Foundry Notes.

The contract has been let for a large four-story brick building on First and Natoma, and the old wooden building that has long stood upon that site has been torn down to give way for the new structure. The Pacific Metal Works are the owners.

A FORTY-TON GASOLINE ENGINE SCHOONER, built at Benicia for Justinian Caire and designed to run between Santa Rosa island and Santa Barbara, has been brought down from Turner's yard and will fit out at Mission pier 1 for her trip south.

The new steam schooner *Excelsior*, which recently arrived here from Eureka, has gone to Folsom-street wharf have her boilers put in, after which she will be towed to the Fulton Iron Works at Harbor View to receive her engines. The *Excelsior* is the largest steam schooner on the coast, having a length of over 200 feet; she is over 700 tons burden. She was built to run between Eureka and San Diego, and will be ready for sea by June 1st.

The British ship *Alcides*, which arrived last month from Newcastle, England, has discharged at Union-street pier, 290 steel plates for ship-building. The plates are 40 feet long, one-half inch thick, and of various widths. They are for the Union Iron Works to be used in the construction of vessels building there. The *Alcides* also has among her cargo 200 tons of steel shearings or clippings from large steel sheets which are consigned to the Judson Nail Works at Oakland.

The steamer *Arago* is at the Union Iron Works undergoing extensive alterations. Goodall, Perkins & Co., the new owners of the steamer, intend having cabins and passenger accommodations built on the *Arago* to correspond with those on the *Corona* and *Pomona*. The steamer *Arago* is 620 tons register and was built here in 1885. She was the first iron vessel built on this coast and was constructed at the Union Iron Works, an establishment which has since distinguished itself by work on large war vessels for the Government.

The San Francisco Tool Company has just shipped a very large centrifugal pump for drainage and reclamation purposes. This is the second sent from these machine works to the tule lands on the San Joaquin river within a few weeks. The first pump has a capacity of 10,000 to 15,000 gallons per minute, while the one on the road will pump 30,000 to 40,000 gallons per minute. The diameter of the discharge pipe in the smaller is 20 inches; in the larger 40 inches. The pump is strong and well made, on special designs adopted by these works. The Tool Company has made a specialty of this class of pumps, and has quite a number of them at work on the tule lands of the State.

The Olympic Club Salt Water Company, which has a franchise for selling salt water in this city and is now laying its supply and distributing pipes, is delayed in its work because the pipe does not come fast enough from the

manufacturers in Oregon. This is a San Francisco company, with San Francisco capital, intended to make its profits out of San Francisco people, yet it sends to Portland, Oregon, for the pipe used in its entire plant. This is not the kind of enterprise to be encouraged. There are several of the largest pipe-manufacturing concerns on the coast located in this city, and they ship it in all directions, yet our own people when wishing to buy go somewhere else to save a few dollars. The new Vallejo Water Works did the same thing, sending to Portland, Oregon, for pipe to save \$700 on a big contract. The Olympic Company might have been patriotic enough to buy their pipe if not in their own city at least in their own State.

Coast Industrial Notes.

LOCAL capitalists are making a move to erect a wool-scouring establishment in Reno.

THE exports of flour from San Francisco in April were 76,980 bbls of wheat, 536,561 cts.

BIGGS, Butte county, wants a fruit cannery, as there are thousands of acres of fruit trees of all varieties near the town.

NAPA voted bonds to the amount of \$27,000 for the building of Third-street bridge. The structure cost \$25,825.62 and is a useful ornament to the city.

In the year 1892 the Southern Pacific Railroad Company used 6,000,000 feet board measure of timber in repairs of track. Very few iron bridges have been built, as they are too costly.

THE 350-foot ocean wharf at Shelter cove went all to pieces the other day while the steamer *Emily* was landing her freight upon it. The wharf was the property of H. Dutard of this city.

DURING the month of April the total catch of the salmon canneries on the Columbia river was 78,124, or 24,038 cases. A comparison with the records of 1891 and 1892 shows that this is 32,624 more fish than were packed in April, 1892, and 17,101 less than in April, 1891.

THE new electric road from Oakland to Alameda is now completed and in operation. The officers of the company are: President, W. M. Rank; vice-president, Colonel F. H. Meyers; secretary, S. H. Bass; directors—E. S. Denison, W. H. Bailey, W. M. Rank, F. H. Meyers and S. H. Bass.

THE Uncle Sam quartz mine, (W. M. James, formerly of Sierra City, superintendent), says the *Redding Free Press*, is averaging \$30,000 monthly yields or \$1000 a day. The ore reserves there are said to be larger than those of any ledge in the State. Chlorination works are in full blast.

THE Carson river dredger was launched at Dayton last week. It has been building for a month under the supervision of Captain J. W. Hatch. The boat is eighty feet long and thirty feet wide. She was christened the *Pearson Halstead*. It is expected that it will recover the quicksilver from the river which was wasted by the mills.

IN traveling over the coast division Railroad Commissioner Beckman found about 900 men at work on the railroad extension between Santa Margarita and San Luis Obispo. There was also a large number of men working on the bridge crossing the Merced river in the San Joaquin valley. Cretaceous piling was being used for a foundation.

A SHIP was cleared from this port on Saturday with a cargo of wheat for Dunkirk, France. This is the first cargo of the kind from this port to a direct port in France for at least a full year. Some years, French dealers have operated extensively in this market, and many cargoes have been shipped to Havre, Dunkirk, or some other port in France.

JUDGE TORRANCE of the Superior Court at San Diego, has decided in favor of a mechanic's lien taking precedence over mortgage holders in the case of the Pacific Mutual Life Insurance Company of San Francisco vs. John C. Fisher et al., involving the priority of claims in the settlement of the Opera-house suit. The mechanic's lien amounts to about \$25,000.

ANOTHER application for a franchise to operate an arc and electric light system in Alameda was made to the Alameda City Trustees on Monday by W. M. Rank, F. H. Meyers and W. H. Chickering, the first two being the President and Vice-President respectively of the new electric street railroad company, which has established their power-house on Webster street.

THE election at Santa Rosa on the proposition to bond the city for the construction of new water works, to be owned by the city, was one of the hottest in Santa Rosa's history. The proposition was adopted. There were 981 votes cast, of which 730 were in favor of the proposition and 251 against. It is the intention of the city council to put in the pumping system known as the Wagner steam filter wells.

THE *Silver State* is informed that the smelter at the White Cloud copper mines, Lovelock, Nev., was started up last week and made a successful run. One hundred and five tons of ore were smelted in three days and a half, the result of the run being fifteen tons of matte. The smelter was closed down on account of running out of ore, but the force of miners has been increased and it will be started up again soon.

THERE is a movement among some of the business men of Red Bluff to raise money to build works for the manufacture of the Wise combined harvesters, one of the machines having just been built at the foundry at that place. There is wisdom in such a course, for if people of a town or city will manufacture the machinery they require it will keep money at home, give employment to labor and make business for the merchants and trades.

A DESPATCH from Los Angeles dated May 4th says: The Collector of the Port this morning received orders from the Secretary of the Treasury directing him to station

one of his deputies at Santa Monica, that being made a sub-port of entry to the customs district of Los Angeles. This is of great significance, as it places Santa Monica (Port Los Angeles) on an equal footing with San Pedro. This means that vessels from foreign ports can land at Santa Monica (Port Los Angeles) and discharge their cargoes.

THE San Francisco Slate Quarry, El Dorado county, has completed its preparations for operating the mine by machinery, and set it in motion. It comprises an air compressor which will be used in operating a channeling machine, drills and other appliances for getting the slate from the quarry. A small dynamo has also been set up at the mine and all the buildings will be lighted with electricity. The San Francisco Quarry has now better facilities for economical working than any other mine on the coast.

THE steamer *Noyo* arrived on May 5th from Fort Bragg with the fifth cigar-shaped raft brought to this port. The raft contains 1,500,000 feet of redwood logs, and was broken up during the day at the foot of Center street. The logs will be cut up at the Potrero sawmill, and the sawdust and slabs, which have a market value as well as the boards cut, saved. Lumber freights are \$3.50 and \$3 per 1000 feet. It is claimed that by the cigar shaped raft method, logs can be brought here for \$1 per 1000 feet, and that the sawdust and slabs, which are waste in a lumber district, can be made to pay the cost of bringing the logs here.

THE Pacific Iron and Nail Works of Oakland shut down last week and will remain closed for six weeks or two months. There are about 200 men employed by the company. This is the regular summer shut-down. President H. J. Sadler says: "We have a large stock of manufactured goods on hand. Prices for iron products are very low just now—indeed, lower than they have ever been; but in the East, just the same as here, there has been an overproduction, which accounts for the depression. I think this is the true reason for the ruling prices in the iron market, but the condition of the market has nothing to do with the closing of the works."

DURING the past few weeks there has been formulated at San Bernardino a plan to irrigate the largest tract of land in one body to be found in southern California. This will be accomplished by damming the Mojave river at Victor, creating an artificial lake nine miles long, three miles wide and 130 feet in depth, water sufficient to irrigate 200,000 acres of desert land. The Victor Reservoir Company has been quietly at work for some weeks securing options on land and water rights. Some wealthy Eastern men have taken stock in the company, and it is announced that contracts may be entered into at once for water rights. The water will be diverted upon Government land now unoccupied and subject to settlement and reclamation. It is estimated that the entire cost of construction will be less than a million dollars.

MARSHALL J. KINNEY, one of the oldest and most extensive salmon packers at Astoria, makes an important statement regarding the Alaska salmon industry. He says: "I consider the Bering Sea and Cook's Inlet will be the future field for the salmon industry. I think the pack of Northwestern Alaska will reach over 1,000,000 cases in less than five years. Half the salmon streams, as near as I can learn, are not even touched. When we have better railroad facilities to Astoria I expect the cold-storage and fresh-fish business on the lower Columbia and in Alaska will be simply enormous. Alaska is the coming field for the salmon industry, and fully expect that the production will double inside of five years. Mr. McKinney shows that the pack has increased from 36,000 cases in 1883 to over 480,000 cases in 1893. He says that the stores and gear sent north this year indicate that the Alaska cannerymen are preparing for the largest pack on record. He calculates that it will reach 800,000 cases."

THE Olympic Salt Water Co. of this city has leased for 20 years a large lot on Bush and Larkin streets. The company intends building a four-story brick structure to be used as a public salt-water bathing institution. One of the features of this building will be a magnificent swimming bath 200 feet long and 100 feet wide. Round the bath, overlooking the tank, there will be arranged a fine auditorium with seating capacity for from 2000 to 3000 people. In addition to the swimming tank there will be every kind of tub, medicated, Turkish, Russian, steam and electric baths. Out at the beach the foundations are being put in as rapidly as possible for the one-story brick steam pumping station. This establishment will have powerful compound engines capable of forcing the water into the salt-water mains all over the city. The contracts for the foundations, which will cost \$10,000, have been let, as also for the grading, engines, boilers and reservoir.

THE San Francisco MINING AND SCIENTIFIC PRESS of the 6th instant devoted a great deal of its space to the hydraulic mining cause. The PRESS is one of the best friends the hydraulic miners have, and its efforts in their behalf have been quite instrumental in bringing about the change of feeling throughout the State toward this process of mining. The paper is certainly entitled to the good will and support of the entire mining community.—Grass Valley Union.

THE official statement of gold in the Treasury for use, made to Secretary Carlisle at the Cabinet meeting, shows that the gold in the Treasury amounts to \$97,401,000; gold in transit, \$556,000; total, \$97,957,000. The total gold in the country, as estimated by the Treasury officials' circulation statement, aggregates \$613,000,000, of which \$518,000,000 is in circulation.

A MONTHLY PUBLICATION on "Popular Astronomy," mainly for amateurs, is to be issued by Wm. W. Payne, publisher of astronomy and astro-physics, Goodsell Observatory of Carleton College, Northfield, Minn.

The New State Mining Bureau Law.

An Act to provide for the establishment, maintenance, and support of a bureau, to be known as the State Mining Bureau, and for the appointment and duties of a Board of Trustees, to be known as the Board of Trustees of the State Mining Bureau, who shall have the direction, management, and control of said State Mining Bureau, and to provide for the appointment, duties, and compensation of a State Mineralogist, who shall perform the duties of his office, under the control, direction, and supervision of the Board of Trustees of the State Mining Bureau.

[Approved March 23, 1893.]

The people of the State of California, represented in the Senate and Assembly, do enact as follows:

SECTION 1. There shall be and there is hereby established in the State of California a Mining Bureau, the principal office of which shall be maintained in the City of San Francisco, which said Mining Bureau shall be under the supervision of a Board of Trustees, to be known as the Board of Trustees of the State Mining Bureau, and it shall be the duty of, and the Governor of the State of California is hereby authorized and empowered to appoint five residents and citizens of the State to be such trustees.

SEC. 2. The appointees shall take the same oath of office as other State officers, and when duly qualified and assembled shall constitute the Board of Trustees of the State Mining Bureau. They shall hold office for four years from the date of their appointment, or until the qualification of their successors, and shall receive no compensation for their services. They shall have control of all properties and funds of said bureau, and shall have the power by the name of said board to sue and defend. Three of them shall constitute a quorum for the transaction of business. They shall elect one of their number to be president of said board, and shall keep a record of their proceedings. They shall adopt rules and regulations for their government not in conflict with the laws of the State.

SEC. 3. It shall be the duty of the Governor of the State of California, and he is hereby empowered to appoint a citizen and resident of this State, having a practical and scientific knowledge of mining and mineralogy, to the office of State Mineralogist, which office is hereby created. Said State Mineralogist shall hold his office for the term of four years from the date of his appointment, or until the qualification of his successor. He shall take and subscribe the same oath of office as other State officers, and shall give bond for the faithful performance of his duties in the sum of twenty-five thousand dollars, said bond to be approved by the Governor of the State of California. He shall receive for his services a salary of two hundred and fifty dollars per month, to be paid in the same manner as the salaries of other State officers, and shall also receive his necessary traveling expenses when traveling on the business of his office, said expenses, when approved by the Board of Trustees of the Mining Bureau, to be allowed and audited by the State Board of Examiners. The said salary and expenses shall be paid out of the Mining Bureau Fund, herein provided for, and not otherwise.

SEC. 4. It shall be the duty of said State Mineralogist to make, facilitate, and encourage special studies of the mineral resources and mineral industries of the State. It shall be his duty: To collect statistics concerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic or commercial importance, such collections constituting the museum of the State Mining Bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the Library of the State Mining Bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of the State, to consist of such collections and library, and to arrange, classify, catalogue and index the data therein contained, in a manner to make the information available to those desiring it, and provide a custodian especially qualified to promote this purpose; to make a biennial report to the Board of Trustees of the Mining Bureau, setting forth the important results of his work, and to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this State.

SEC. 5. Said State Mineralogist shall have the right to appoint competent assistants and qualified specialists when necessary in the execution of his plans, and fix their compensations, but all such appointments and compensations shall be subject to the approval of and confirmation of said Board of Trustees, and shall not become effective unless so confirmed and approved. And it shall be the duty of the State Mineralogist to consult the Board of Trustees upon all matters pertaining to his official duties, and he shall at all times perform such duties subject to the supervision and approval of said Board of Trustees.

SEC. 6. It shall be the duty of the Board of Trustees of the State Mining Bureau, when the funds of the said Mining Bureau will permit, to procure and maintain the necessary rooms and furniture for the offices and uses of the said Board of Trustees and the State Mineralogist, and the museum and library of the Mining Bureau in San Francisco; *provided, however,* that the entire expenses of the State Mining Bureau for salaries, assistance, light, rent, fuel, furniture, and all other things pertaining to said Bureau must not, in any one year, be greater than can be paid out of the Mining Bureau Fund herein provided.

SEC. 7. The Board of Trustees of the State Mining Bureau shall manage and control all the finances of said

Mining Bureau, and shall make rules regulating the custody and disbursement of the funds of the State Mining Bureau, and the mode of drawing the same from the State Treasury.

SEC. 8. The Board of Trustees of the State Mining Bureau shall biennially report to the Governor of the State the condition of the Bureau, with a statement of the receipts and disbursements in detail, and with said report shall be incorporated the biennial report of the State Mineralogist, and the report of said Board of Trustees and State Mineralogist shall be printed as are the reports of the other State officers.

SEC. 9. The Board of Trustees of the State Mining Bureau are hereby empowered and authorized to receive, on behalf of the State, for the use and benefit of the State Mining Bureau, gifts, bequests, devises, and legacies of real or other property, and to use the same in accordance with the wishes of the donors; and if no instructions are given, by said donors, to manage, use, and dispose of the said gifts, bequests, and legacies for the best interests of the said Mining Bureau in the manner they may deem proper.

SEC. 10. The State Mineralogist may, with the approval of the Board of Trustees of the State Mining Bureau, prepare a special collection of ores and minerals of California, to be sent to any World's Fair or Exposition at which they may deem it advisable or desirable to display the mineral wealth of the State.

SEC. 11. The Mining Bureau Fund herein mentioned, and out of which all the expenses of the State Mining Bureau shall be paid, shall consist of such property or moneys as may come into the hands of the Board of Trustees of said Bureau by gift, bequest, devise, or legacy; of such moneys as may, from time to time, be appropriated by the Legislature of the State for the use of said Bureau, and of such moneys as shall be paid into the State Treasury for the use and benefit of said Bureau, as provided in the following section:

SEC. 12. It shall be the duty of the Tax Collectors in the several counties in the State and of the License Collector of the City and County of San Francisco, on the second Monday in January, April, July, and October, in each year, to transmit by express, to the State Treasury, all moneys collected by them from mining corporations, or from corporations formed for mining ores, or for supplying water for mining purposes under or by virtue of the Act entitled "An Act imposing a tax on the issue of certificates of stock corporations," approved April first, eighteen hundred and seventy-eight, and to forward to the State Controller, by mail, a certificate showing the amount of money so forwarded to the State Treasurer, and the date when the same was transmitted, and also showing the names of the several corporations from which the same was received, and the amount received from each. The State Treasurer shall receive the amounts so transmitted, and give duplicate receipts therefor, one of which shall be filed with the State Controller, and the other shall be forwarded to the Collector from whom the money was received; and after paying out of the money so received the charges for the transmission thereof, the amount of which shall be noted on the receipt filed with the State Controller, he shall retain the remainder in his hands and place it in the Mining Bureau Fund, said Mining Bureau Fund to be used only in the payment of drafts made for the expenses of the Mining Bureau established under this Act.

SEC. 13. Such Tax Collectors and License Collectors shall hereafter be required to pay into the County Treasuries of their respective counties only that portion of the moneys collected by them under the Act of the Legislature mentioned in the last preceding section, approved April first, eighteen hundred and seventy-eight, which is collected from corporations other than those mentioned in section twelve of this Act.

SEC. 14. The Board of Trustees, now known as the Board of Trustees of the State Mining Bureau, shall perform the duties of the Board of Trustees of the State Mining Bureau, as in this Act provided, and administer the affairs of the State Mining Bureau, as in this Act provided, until the appointment and qualification of their successors, as in this Act provided, and the State Mineralogist, now performing the duties of the office of State Mineralogist, shall perform the duties of the office of State Mineralogist, as in this Act provided, until the appointment and qualification of his successor, as in this Act provided.

SEC. 15. The Act entitled "An Act to provide for the establishment and maintenance of a Mining Bureau," approved April sixteenth, eighteen hundred and eighty, and the Act entitled "An Act supplementary to an Act entitled 'An Act for the establishment and maintenance of a Mining Bureau,' approved April sixteenth, eighteen hundred and eighty," approved March twenty-first, eighteen hundred and eighty-five, and all Acts and parts of Acts in conflict with the provisions of this Act are hereby repealed.

SEC. 16. This Act shall take effect and be in force from and after its passage.

The Garfield-Virginia Mines.

TO THE EDITOR:—These mines, owned and worked by the Consolidated Garfield-Virginia Mining and Development Co., have turned out to be very valuable property. They are located on the Tuolumne river, in Tuolumne county, and on one of the best mineral belts in California. Exceedingly rich rock has been found in these mines; the formation is black slate of metallic character; the ore is principally free milling. This company being in possession of valuable water-rights and a practically unlimited supply of water, the power for all purposes can be easily obtained. In a tunnel run in on the vein near the river and directly above the millsite, a large body of pay quartz was struck. This same tunnel will eventually give hacks of over 2000 feet. There are very few mines which have the same facilities and which can be as cheaply and easily worked as the Garfield-Virginia mines. Being worked entirely by levels from the mountain side, it saves the expense of hoisting

machinery, pumps, etc. Several mines on the same lead and within a short distance of the Garfield-Virginia, have been hoisted to prominent mining men recently.

A. C. M.

The Real Significance of the World's Fair.

The President, the members of the Cabinet, the foreign grandees and the military and naval officials went to Chicago, and on Monday of last week the great fair was formally opened. Here again it rained, and the fair grounds were half flooded and unequally muddy, but this did not prevent half a million people from being on hand. The clouds cleared away toward midday, and the ceremonies were held in the open air. There was a splendid assemblage of notables, including the Spanish Duke of Veragua, a lineal descendant of Columbus, who is the guest of the American government. Mr. Cleveland delivered the formal address, which was admirable, both in its matter and in its brevity. He said:

I am here to join my fellow-citizens in congratulations which best fit the occasion. Surrounded by the stupendous results of American enterprise and activity, and in view of the magnificent evidences of American skill and intelligence, we need not fear these congratulations will be exaggerated.

We stand to-day in the presence of the oldest nations in the world and point to the great achievements we here exhibit, asking no allowance on the score of youth. The enthusiasm with which we contemplate our work intensifies the warmth of greeting we extend to those who have come from foreign lands to illustrate with us the growth and progress of human endeavor in the direction of a higher civilization.

We, who believe popular education and the stimulation of the best impulses of our citizens lead the way to the realization of the proud national destiny which our faith promises, gladly welcome the opportunity here afforded to us to see the results accomplished by efforts which have been exerted longer than ours in the field of man's improvements, while in appreciative return we exhibit the unparalleled advancement and the wonderful accomplishment of a young nation, and present the triumphs of a vigorous, self-reliant and independent people.

We have built these splendid edifices, but we have also built a magnificent fabric of popular government, whose grand proportions are seen throughout the world. We have made, and here gathered together, objects of use and beauty, the products of American skill and invention. We have also made men who rule themselves. It is an exalted mission in which we and our guests from other lands are engaged as we co-operate in the inauguration of an enterprise devoted to human enlightenment; and in the undertaking we here enter upon we exemplify in the noblest sense the brotherhood of nations.

Let us hold fast to the meaning that underlies this ceremony, and let us not lose the impressiveness of this moment. As by a touch the machinery that gives life to this vast exposition is now set in motion, so at the same instant let our hopes and aspirations awaken forces which in all times to come shall influence the welfare, dignity and freedom of mankind.

We print this speech in full because it is worth everybody's reading. It emphasizes in the fewest words the real significance of the fair.

The President ceased speaking at ten minutes past noon. He paused a moment, then he grasped the electric button and pressed it firmly. Instantly the veil fell from the enormous golden statue of Liberty at the entrance of the lagoon, a hundred fountains spread their jets of water high in the air, a thousand banners were set free and fluttered in the wind, and 100,000 throats raised a mighty shout, whistles on the boats belched forth a shrill, ear-splitting scream, out on the lakes big guns thundered, haws were flung in the air, and afar the locomotives, taking up the sound, added to the fast-increasing volume of noise with the loud tooting of their whistles. Buffalo Bill's Indians and cowboys added their yells, and everything capable of producing noise within a square mile did its best in that direction.

A Dry Washer.

The *Genoa Courier* says: Last week Howard Beers gave an exhibition at Harris' store of the working of the Freeman "Dry Gold Separator," the most practical machine for working dry dirt we have ever seen. It weighs about 35 pounds and is conveniently arranged to be carried on a man's back, and only cost \$25. From two to four tons of dirt can be worked on it per day and it will save as fine colors as can be obtained with the miner's pan. The small machine is turned by a crank. The dirt is thrown upon a slanting screen on top, and falling through strikes upon a rifled table of wire and cloth. By means of a double bellows the air is forced through this fine wire screen in little gusts, moving the dirt up and down and as it passes down over the fine screen the gold lodges on the riffles. The machines are manufactured in Los Angeles and the large ones weigh about 250 pounds and are capable of working from 80 to 100 tons of dirt a day. They are said to be used with great success in Arizona. As soon as the weather settles, Mr. Beers will go to Pine Nut and make a test on Wm. Cohen's claim adjoining the Monarch. Old miners regard this as this best dry-wash machine ever invented.

Mining in Tuolumne County.

TO THE EDITOR:—One of the best though least developed mining counties in California to-day is Tuolumne. Within the last six months or so the eyes of mining men seem to have been cast in that direction. A number of mines have changed hands recently, while others in that county have been hoisted to prominent mining men. Capitalists seem to awaken to the fact that there are enough good mines to be found right at home, and that there is no necessity of going outside the United States boundaries, looking for mines which are principally on paper only or else almost inaccessible for purposes of working them.

M.

The Ideal Currency.

TO THE EDITOR:—"Once upon a time," a small State wanted a market-house. Instead of borrowing money on interest, the people, through their parliament, issued notes to the amount of \$20,000. These were paid to a contractor as the work went on, and with them he paid the wages of those whom he employed, who, in their turn, passed them to others in payment for food and other things, and so the notes were kept circulating and serving every purpose of money, which they were in fact. When the market-house was completed, it contained 80 stalls, and these were let to butchers at \$25 a year each. The notes were received by the State in payment of rent until all of them had been turned in—that is, during ten years—and from that time to the present the market-house has been a source of revenue. This is history, though not very widely known. For further particulars, see the *Star* newspaper of this city, April 8, 1893.

At first sight this looks like a very good scheme; on second thought the question presents itself, inasmuch as the market-house did not cost the State a cent, how did the State come to be the owner of it and derive revenue from it? On further reflection this question is answered as follows: The building was erected for the benefit of the community, and when completed it had a value beyond that of the material and labor employed in its construction. This extra value was created by the presence and activity of the community, hence was the property of the community, it was the "unearned increment." If anyone doubts this, let him consider what would have been the effect if the community had moved away from that vicinity; clearly the structure would then have lost almost all of its value. Hence, the State was justified in paying its notes by permitting the holders to enjoy the use of the structure, plus that of the unearned increment, during a limited period when, all debt having thus been paid, no owner other than the community could possibly exist. There is a profound lesson in this view, which I commend to the consideration of social reformers. My present concern, however, is with that aspect of the case which bears on the question of the currency.

Why may not this system be extended to the exclusion of every other? Let us consider.

Suppose two States, A and B, both moneyless, and both desiring to establish a medium of exchange. A puts a number of men at work digging holes in the mountain from which, with great toil and some danger to and sacrifice of life, they gradually win a quantity of gold. The Government converts that gold into coin, with a further expenditure of labor, and, after paying the wages of the miners, distributes the remainder of the money among the miners. This is simply free coinage of gold. The miners pay the coin to merchants for supplies, the merchants pass it to farmers, manufacturers, etc., and so in course of time the community finds itself with a circulating medium.

B, in the meantime, has put men at work digging a canal for the benefit of the community, and has given them its printed acknowledgment of service received, that is to say, notes. The laborers pay the notes to merchants for supplies, and the merchants pass them to farmers, manufacturers, etc., and so this community is also provided with money.

The two States are now in the following positions: A has a circulating medium and sundry useless holes in the ground; the substance of its money is worth its cost in the markets of the world. B has a circulating medium and a canal. The substance of its money is worth nothing, but the canal is worth more or less than its cost, according as it was judiciously planned and constructed, for it must not be forgotten that it is possible for the State to make a bad investment.

Coin and notes are alike certificates of service rendered by the holders. How much better than pieces of paper would the coins be if they could not be exchanged for service? and how much worse than coins are notes that can be so exchanged? Whether coin or note, the money, or certificate of service rendered to the State, is cancelled when paid to the State for service returned by the State to the individual, and may again be issued by the State to an individual for service rendered by him to the State. The ideal currency consists of printed promises, made by the State, to return the service of which they are the evidence. It has no other guarantee than the good faith of the Government and its ability to fulfill. A currency of good coin is also a promise, but it carries with it, in the substance of which it is made, the guarantee of the whole civilized world. Which is the best suited to our conditions?

The financier, statesman, or philosopher, who fails to take account of the human passions, prejudices, habits and faults is sure to err grievously in his plans, his legislation, or his deductions; and there are certain considerations which bear on the practicability of the ideal currency at the present day.

Governments are composed of men, and among men some are dishonest, many are unwise. The power of making money with a printing press has a great fascination for both of these classes. For the first, because they see in it an easy road to dishonest gains; for the second, perhaps, because they have a vague idea that a man may elevate himself by a process analogous to that of climbing up his own back. The first remember to forget, and the second forget to remember, that every dollar issued is a promise of service to be rendered at last by the State to the holder of the note.

To the unlimited issue of coin there is an insuperable obstacle in the limit to the supply of precious metal, but the only limit to the issue of paper is the law and the conscience; the law may be changed. Few men, still fewer aggregates of men, have been able to resist the seduction of unlimited credit.

If the only expenses of the Government should be for

the construction of railroads, telegraphs and other productive things, the danger of overissue would not be so great; but our Government has not even begun to occupy itself with industrial enterprises, except the postoffice which does not pay expenses. Its revenues are derived almost entirely from the various taxes, and, as the imposition of a tax is always distasteful to the people, it is much to be feared that if the country were given over to credit money entirely, the printing press would be put into operation whenever money should be wanted, and that money would be wanted too often.

If too much paper money is issued—and that has been the result of former experiments generally—the community finds at last that it owes more service than it can repay; that it is deeply in debt. To whom? To itself? What an absurdity! The community as a whole is indebted to the individuals who hold its notes. In business, men are nothing if not selfish; it is the instinct of self-preservation. As soon as a man who holds a considerable amount of the State's paper begins to doubt the State's solvency, he tries to exchange the paper for something else—horses or houses, corn or cattle—and prices begin to rise. It is really the value of the paper money that falls, and the movement once begun, it continues to fall with the acceleration of a body moving under a constant impulse. The expenses of the Government increase, while the revenue does not, and the printing press is set working again, and so on until the paper becomes valueless, or nearly so, and a general collapse of business results.

With a currency of precious metal, an excessive emission, if it were possible, would have the same effect; for a coin, as well as a note, is an evidence of debt because it is an evidence of credit, and credit cannot exist without debt. It shows that the holder has done some service which entitles him to a return. But, as the whole world wants precious metal, it is clear that the whole world must be sated with it before it can lose its value. The man who holds a piece of gold has a draft which will be honored in any but a savage country. This shows the essential difference between "credit money" and good coin. A paper currency fully backed by precious metal is in nearly the same position as coin, at least for domestic use.

If the single tax were established, and especially if the community should own the railroads, telegraphs, water works, light works, etc., the ideal currency should be safe and practicable. The State's rent-roll would furnish a sound basis for all the money that would be needed, to say nothing of the other properties. For the present I fear the ideal currency would be too dangerous to be adopted fully.

But the nation is in debt already to the extent of some six hundred millions in interest-bearing bonds. The debt would not be increased and the interest would be stopped if the bonds should be taken up and paid with legal tender notes. If the credit of the country is good enough to maintain the bonds, it must be good enough to make the notes current, hence the bond-holder who should surrender his bonds in exchange for notes would be as well off as if he should get gold for them, and the men who took advantage of their country's peril to try to saddle their fellows with a perpetual burden should be thankful if the people do not utterly repudiate the base transaction. In time of war we conscript *lives*, which can never be repaid. Why should we not also conscript money?

If we are under an obligation to pay the bonds in coin, why not buy coin with notes, then lift bonds with the coin, again buy the coin and lift more bonds, mature or not, until the whole accursed plot shall be defeated? As to bonds not matured, condemn them as we condemn a house or a field which lies in the way we wish to go? In so far as bonds are held by foreigners, of course the coin would have to leave the country unless the balance of trade should keep it here. But there is coin enough in the country to pay all the bonds, and, if not, we could buy bullion for notes and use that. It would be better that the debt should be owed to our own people, in the form of credit money drawing no interest, than to foreigners, who ask nothing better than that our people shall be their slaves, forever paying to them the product of their toil. Would such action lessen the nation's power to borrow on interest? A consummation devoutly to be wished.

We require to increase our currency by three or four millions every month, to keep pace with the population, therefore let us buy coin to that amount every month, and take up an equal amount in bonds. Does any one doubt that the people would sell coin for notes? Let that one explain why it is that the people decline the redemption of the greenback, of which over three hundred millions are in circulation. By the bye; that is another debt, and when the six hundred millions of bonds shall be converted into legal tender notes, there will be nearly a thousand millions of "credit money" afloat; yet we shall not from that cause owe a cent more than we do now, our debt will be made useful, and the interest will cease. Yet it will be a long step in the direction of the ideal currency. A war, either civil or foreign, would bring that mass of paper about our ears, perhaps, wherefore let us avoid war.

Fearfully and wonderfully made is the machine which grids the face of the people, and makes them the slaves of their masters, and an interest-bearing national debt is one of its most important levers of which the unsymmetrical fulcrum gives to the few the power to control the many. Is it not absurd that men should be permitted to issue money, to loan on interest, on the basis of bonds which also draw interest? This is a compounding of the lever which doubles its efficiency for squeezing the victims.

Oh, the masses, them asses! It does give me "that tired feeling" to see how meekly they stand before the tyrants who will mount them and ride, consuming the grain and pampering them with the chaff and straw within their ribs, the cudgel without. But what of it? Are we not a free people, the greatest nation on earth? and if we choose to put riders on our backs, spurs and all, shall we not do it? And are we not getting up in the world, since we are represented at the Court of St. James by an Ambassador in full bloom? Then let us make a joyful noise unto the Lord! Yea, verily, let us pray!

C. H. AARON.

The Double Standard.

TO THE EDITOR:—The arguments against the "double standard" used by Mr. Aaron in his discussion of the subject in your issue of April 15th can hardly be regarded as conclusive.

In the first place, let me premise that the object to be attained by any system is, or should be, under honest and intelligent legislation, to demonish the fluctuations in the exchange value of money—not to maintain a standard simply as such. That the bi-metallic system affords a better means of securing this result than does the single standard is obvious enough, even on Mr. Aaron's own showing. He contends that, on any change occurring in the relative value of two money metals, special contracts would be required to secure payment in the more valuable, thus showing that the natural consequence of the alteration in the relative value of the metals is to diminish the circulation of the more valuable and increase the use of the less valuable, which is a direct and efficient remedy for the anomalous state of things supposed (and only supposed), and must, in due course, restore the desired equilibrium.

It must be remembered that when once the ratio of the two metals is equitably adjusted, the only probable reason for any change in their relative market value would be diminished difficulty of production of one metal or increased difficulty in obtaining the other. With a mono-metallic system any change in the exchange value of money that occurs from the cause indicated is sudden and as permanent as its conditions, while with a bi-metallic basis both metals must be at the same time affected alike and to a far more intense degree—a coincidence in the highest degree improbable—in order to produce an equally disastrous result.

It will thus be seen that the bi-metallic monetary system is, to a very great extent, self-adjusting, and affords the most stable basis for payments in the future—that is, for contracts.

The argument of Mr. Aaron against two kinds of legal tender, on the strength of the depreciation of greenbacks, is irrelevant, as greenbacks are not money but promises to pay it, and depend for their exchange value on each man's idea as to what the promise is worth.

So much for the comparison of systems. Now, if a single standard be adopted, and that metal be, as it should be, desired which is subject to least fluctuation in its exchange value, the intrinsic superiority of silver to gold, in this regard, cannot reasonably be denied. Reasoning even *a priori* from the manner of production of each—silver invariably requiring expensive work and all the costly appliances of metallurgy, while gold is found to a very great extent ready made and is frequently obtained in large quantities with little expenditure of any kind—we would naturally infer that the exchange value of silver would be by far the more stable; but when, in addition, we review the monetary history of the past 20 years, when we find that, notwithstanding a ruinous demonetization policy and the resulting discredit and degradation of silver, it still maintains almost undisturbed its exchange value, as bullion, in relation to the more important commodities, wheat, cotton, etc., to the national loss, the ruin of multitudes of the producers of these commodities and the lasting disgrace of the authors of so disastrous a policy—in the face of this remarkable showing there is little excuse for the man who refuses to be convinced of the immeasurable superiority of silver to gold as a single standard of value.

Austin, Nev., May 6, 1893.

D. S.

Free Silver Coinage and National Banks.

TO THE EDITOR:—Much has been written for and against the coinage of silver. The time has come for the silver men to find out what class of men are opposing free coinage of silver, and, if possible, what their object is in so doing.

Most of the many magazines contain articles written from a gold standard view, but with such a national bank flavor that it can be seen they mean interest-bearing paper money, the gold standard taking second place. To get the Government to redeem national bank notes by any device is the main object. Almost every article written proposes some scheme to get government bonds to start banks. Some propose State, municipal and railroad bonds; others advocate no bonds at all—anything that will accomplish their object.

They all condemn the coinage of silver. This is Mr. Horace White's scheme from the "Annals of the American Academy," March, 1893: To continue national banks without bonds, he says, create a fund out of the present tax (one-half of one per cent) on bank notes; then add to this as further security the property the government officers secure when a national bank fails. He thinks this would be entirely safe for the Government to continue its responsibility to redeem the notes on these conditions. He says only five per cent of the banks fail; this would leave a very small amount of second-hand stuff.

Another by Mr. Moses Bruhl in the "Forum," March, 1893: It is head-lined "Cease Purchasing Silver and Issue Bonds." He proposes that the Government issue five hundred millions of bonds to bear two per cent interest, redeemable at the pleasure of the Government, and have no other kind of money above five dollars in value.

This would turn all United States Treasury notes and silver certificates that draw no interest into national bank notes that draw ten per cent per annum, in the usual double way these notes draw interest. This device does not look like a gold standard.

Yet another by the Hon. Henry Bacon in the "Annals," 1893, headed "Basis or Security for National Bank Notes," wishes to give State, county or municipal bonds as security. These bonds draw more interest than government bonds, and can be obtained in any quantity desired. If this was

adopted, the returns would be this: State bonds at 7 per cent interest, this going to the bank, and the same value loaned over the counter at 8 per cent. Fifteen cents per annum would be the cost to the people to circulate one dollar of national bank money one year.

This shows the object of the men who are crying about the dishonest silver dollar. Their plan to condemn silver is to begin at the formation of this Government and give a history of the values of silver and gold bullion, when a time is found that the gold bullion was a few cents higher than silver. We are told how very near we were to a financial panic, but it did not take place. A few years more silver raised above the gold bullion, and again the country narrowly escapes. Then a dose administered to remind us of the danger of keeping a double standard of money, and warned that the financial system of this country will go to pieces if it is not stopped. This is continued at short intervals up to about 1870. Here the record suddenly stops and skips a time when a villainous act was committed against silver in 1873, when it was demonetized. On this they are silent—very silent—but commenced about 1880 this way: "Now that silver has fallen in price below gold, lower than ever before, owing to overproduction, it became necessary for the United States to cease to use it for money and establish the gold standard." Cheap money, sound money will not circulate; the poor money will drive the good out of circulation.

Then we get a lesson of cheap money and inflations commencing with George Lau's operations in France and the Argentine Republic inflations in South America. All the miseries and troubles, both financial and physical, that afflicted these nations are carefully reviewed.

Then the Hohenzollern board of silver in Germany is worked, as also the fear that this would be made the dumping-ground for the silver of all nations.

The farmer is warned that, should silver be coined, his farm would not support him and his family; the laboring man that his wages will be paid in a debased currency (?). Why is all this done? Because the national banking system must be upheld by deception! The masses of the people do not understand this. The banks perform no services that cannot be done by the Treasury of the United States under the direction of Congress.

The banks absorb millions of dollars in interest produced by the labor of others, and give no value in return. Their parents were monopolies and trusts. They are worse usury gatherers than those thrown out of the temple at the beginning of the first century by the Savior of mankind for taking one interest on one value; but at the close of the nineteenth century these men come forward and demand two interests on one value, or they will give us no money. If the verdict of the people of this country is right, our Republic lives in fact; if wrong, it exists only in name.

Shasta, May 1, 1893. J. E. BELL.

Churntown District, Shasta County.

TO THE EDITOR:—The group of mines being opened up by Major Lyons has brought this district into prominence. A number of St. Louis capitalists are interested in the enterprise.

The Churntown district lies east and north of Old Diggings and is three-quarters of a mile due east of the Sacramento river, Sec. 22, T. 33, S. W. There are three parallel ledges on the location; the strike is 18 degrees east of north and the dip 42 degrees westerly. Tunnels have been driven on all three veins, in each instance opening up large bodies of ore. The west side of the hill is, however, the chief point of attack; 300 feet below the summit a tunnel is being driven with the object of tapping all three ledges. Owing to the contour of the hill this can be easily accomplished and a decided advantage will be gained by having the works on the side next the Sacramento river. This tunnel is now in for 300 feet; the survey gives 400 feet farther to the nearest ledge. Several hundred feet additional of backs can be obtained.

The formation is slate, metamorphic on the surface, but as depth is gained it becomes talcose, or more correctly, a hydro-mica slate. Iron staining gives the country rock a porphyritic character.

The grade of ore is high; there is a large percentage of sulphurets with free gold and telluride glance. Numerous assays have been made averaging several hundred dollars per ton. The quartz is of fine texture and similar to that in the Old Diggings district. The ledges average from two to four feet; the walls are well defined with slaty gouge, heavily mineralized; some limonite, rich in free gold, is found next the hanging wall. There are 500 tons of ore on the dumps. Croppings show strong for 3000 feet on the lode; so far as development work has been done no faults have been found; there is every indication that the ledges will reach a good depth. Timber and water are in abundance. Distance from Redding, ten miles. Elevation, 1600 feet. There have been very rich diggings in this district. The company is known as the Rich Gulch Miniog Company, Major Lyons, Manager; the other members reside in St. Louis.

Redding, Shasta County, May 6, 1893. WILLIAM G. HODSON.

IN the United States there are 32,000,000 men and 31,000,000 women. Men are in the majority in all the States and Territories except in the District of Columbia, Massachusetts, Rhode Island, North Carolina, Maryland, Connecticut, New Hampshire, New York, South Carolina, Virginia and New Jersey, in which there are more women than men. The District of Columbia has the largest proportionate excess of female population, and Montana contains the largest percentage of men. In New Jersey the two sexes are most nearly equally represented.

THE COBALT for plating is almost entirely used at present for coloring glass and pottery blue and for blue glaze. Its actual cost is said to be not more than that of nickel, but it is retailed at about five times this cost. If cobalt

plating, as suggested by Dr. Silvanus Thompson, were to come in, cobalt, being used more largely, would soon become as cheap as nickel. The chief ingredient of the most practical process is Epsom salts, through which the silvery metal is deposited. The polishing is done with scratch brushes, and the resultant white coating is almost indestructible by damp or smoky air.

New Estimation Method for Manganese.

Mr. Albert H. Low describes in *Iron* a new method discovered by him for estimating the manganese in ores. The length of time occupied by the entire analysis is said to be never greater than 20 minutes, and none of the usual constituents of ores interfere with the working of the process. The following solutions should be prepared: (1) A standardized solution of potassium permanganate, approximately 1-10th normal. (2) A solution of oxalic acid containing 11.46 grammes of $C_2H_2O_4 \cdot 2H_2O$ per litre; the exact strength of this solution is to be determined by titrating with the permanganate in the presence of hot dilute sulphuric acid in the usual way, and then its value calculated on the basis that $C_2H_2O_4 \cdot 2H_2O = Mn$; it will be found that 1 cubic centimeter will be equal to 0.005 gramme of Mn, or about 1 per cent when 0.5 gramme of ore is taken for analysis. (3) A saturated solution of bromine in cold water, an excess of bromine in the bottle; under the conditions to be described 25 cubic centimeters of this solution will precipitate about 35 per cent of manganese.

In carrying out the analysis 0.5 gramme of the ore is treated in a 16-oz. flask with whatever acids are necessary to decompose it. Usually 5 to 10 cubic centimeters of hydrochloric acid or aqua regia are sufficient. After all traces of free acid have been removed by heat, the solution is diluted with 75 cubic centimeters of hot water and an excess of zinc oxide added. The solution is boiled to effect complete neutralization of the acid. An excess of the bromine solution is then added; about 25 cubic centimeters is usually sufficient, and never more than 50 cubic centimeters should be added. The solution is boiled for a moment or two until the excess of bromine is expelled, and an excess of zinc oxide should all the time be observed in the bottom of the flask. When all the red fumes have disappeared the solution is filtered on a paper 5 inches in diameter and the flask precipitate washed several times with hot water. The precipitate and filter are replaced in the flask and about 50 cubic centimeters of dilute (1.9) sulphuric acid added. Into this mixture is run from a burette an excess of the oxalic-acid solution, and the mixture is heated to boiling; afterward more oxalic acid is added if necessary, so as to complete the solution of the precipitate. After diluting the solution with hot water, the excess of oxalic acid is titrated with the permanganate solution. The amount of oxalic acid actually consumed by the MnO_2 is thus arrived at and the percentage of manganese can then be calculated.

Professor Lorenz and Dr. Heusler, of Gottingen, contribute an interesting paper concerning the supposed volatility of the element manganese to a recent number of the *Zeitschrift für Anorganische Chemie*. Although the melting-point of the metal is known with tolerable certainty to about 1800° — 1900° , much higher than that of iron, no information has yet been acquired concerning its boiling-point. Professors Lockyer and Chandler Roberts, however, so long ago as 1875 pointed out that the metal was volatile at the temperature of the oxy-hydrogen blowpipe; and Mons. Jordan, in a communication to the *Comptes Rendus* in the year 1879, reported that in the manufacture of highly manganeseiferous spiegelisen near Marseilles, a deposit very rich in Manganese was usually found in the cooler portions of the furnace. Moreover, Mons. Jordan stated that during the casting of ferro-manganese red flames are produced, from which a heavy fume is deposited containing a large percentage of manganese. Mons. Jordan subsequently heated ferro-manganese to a white heat in a crucible in his laboratory, and ascertained that a diminution in the percentage of manganese actually occurred. These observations were considered somewhat surprising, inasmuch as the melting-point of manganese is so high, in the neighborhood of white heat, and it would appear that this volatility must be exhibited even at the melting-point itself.

Professor Lorenz and his colleague have therefore conducted a series of experiments with the view of ascertaining whether manganese is really volatile per se, or whether the volatility is due to the intermediate action of carbon-monoxide (derived from the carbon usually present) in forming a volatile but dissociable compound of a nature similar to nickel and iron carbonyl. It was first definitely proved that carbon-monoxide does not combine with manganese below the temperature of 350° , a fact which Mons. Guntz has recently independently pointed out. Experiments were then made at higher temperatures, using a new form of combustion furnace designed by Professor Lorenz, in which each individual burner is supplied with a blast capable of being regulated, the whole apparatus being equivalent to a row of blowpipes which will rapidly raise a thick porcelain tube up to a white heat. In the first series of these high-temperature experiments, coarsely-powdered manganese containing 7 per cent of carbon was heated to whiteness in a glazed porcelain tube in a current of carbon-dioxide, in order that nascent carbon-monoxide might be produced in contact with manganese by the reduction of the carbon-dioxide by the carbon present. After half an hour's heating the tube was allowed to cool in the stream of carbon-dioxide and then broken, when it was found that a large quantity of the manganese had volatilized and condensed again further along the tube, in the form of a thick black deposit somewhat resembling zinc dust.

Upon repeating the experiment with a current of carbon-monoxide, a similar result was obtained. Hence, manganese is certainly volatile in carbon-monoxide. But it was afterward found that equally good deposits of manganese dust were obtained when a current of either hydrogen or nitrogen, neither of which combine with manganese, was employed. It is, therefore, evident that manganese does not resemble iron and nickel in forming a volatile com-

pound with carbon-monoxide, but that the volatility is a property of the element itself, and is singularly manifested even at the temperature of the meltingpoint.

Vastness of the World's Fair.

The scope and immensity of the World's Fair are thus well set forth by Director-General Davis in his speech at the opening exercises:

"Fortunately, at the inception of this enterprise our Government was and still is at peace with the whole world. Commissioners were sent to Europe, Asia, Australia, British North America and the islands of the seas, so, to-day the whole world knows and is familiar with the significance of the great peace festival we are about to inaugurate upon this campus, and all nations join in celebrating the event which it commemorates.

"This inclosure, containing nearly 700 acres, is covered by more than 400 structures, from the small pavilion occupying an ordinary building site to the colossal structure of the Manufactures and Liberal Arts Building, covering over 30 acres, filled and crowded with a display of the achievements and products of the mind and hand of man, such as have never before been presented to mortal vision.

"Surrounding this grand plaza where we stand, and reaching from the north line to the extreme south, is the great mechanical, scientific, industrial and agricultural exhibition of the resources and products of the world. These have been secured from the four quarters of the globe and placed in systematic order under the supervision of these great departments, and while all material upon the grounds is not yet in place I am gratified to be able to present to the President of the United States at this time the official catalogue containing a description and the location of the exhibits of 40,000 participants in the Exposition. The number of exhibitors will exceed 60,000, when everything is in place.

"The citizens of our country are proud and always will be proud of the action of the Congress of the United States of America in authorizing and directing this celebration to take place; for the appropriation of more than \$5,000,000 in its aid, and for unswerving support and encouragement of the officers of the Government.

"To the states of the Union we are largely indebted for active and substantial support, to foreign nations which have representation upon these grounds never before witnessed at any exposition, as shown by the grand exhibits they have brought here, and the hundred of official representatives of foreign Governments, who are present on this occasion, we bow in grateful thanks. More than \$6,000,000 has been officially appropriated for these commissions in furtherance of their participation in the Exposition. The great nations of Europe and their dependencies are all represented upon these grounds. The Governments of Asia and Africa and the republics of the Western Hemisphere with but few exceptions are represented here.

To the citizens and the corporation of the city of Chicago, who furnished \$11,000,000 as a contribution, and in addition loaned the management the sum of \$5,000,000 more, are due grateful acknowledgements. To our own people, and the honored guests who share with us the advantages of this great international festival, and to the tens of thousands of exhibitors who contributed a larger amount than all the others combined, we are under the deepest obligations for their interest and co-operation.

The grand, concerted illustration of modern progress which is here presented for the encouragement of art, of science, industry and commerce, has necessitated an expenditure, including the outlay of our exhibitors, largely in excess of \$100,000,000."

Mail for the World's Fair.

Local postal authorities have received from Washington information concerning the delivery of mail at the World's Fair station, and for the benefit of visitors the same is published. The circular received is as follows:

"For the benefit of persons who intend to visit the forthcoming World's Columbian Exposition at Chicago, notice is hereby given to the public, through postmasters, that there is now in operation, in the Government building on the grounds of the Exposition, a branch of the Chicago postoffice, known as the World's Fair station, and which will continue during the entire period of the great Fair.

"This station postoffice will make regular collections and deliveries through its own force of letter-carriers from and to all parts of the Exposition grounds and will transact money-order and registry business, as well as all other business pertaining to a first-class postoffice.

"Visitors to the Exposition, not knowing before leaving home their precise location in Chicago, may find it convenient to have their letters and other mail matter addressed to the World's Fair station, or to have money orders payable there rather than at the main office at Chicago. Afterward, if desirable, they can have their addresses changed, either by notice to their correspondents, or by application to the postmaster at Chicago, or the superintendent of the World's Fair station.

"Mail matter intended for delivery on the Exposition grounds should be plainly addressed 'World's Fair Station, Chicago, Ill.,' giving, if possible, also, the precise locality in the grounds to which the matter is to be delivered, so that carrier delivery can be easily effected."

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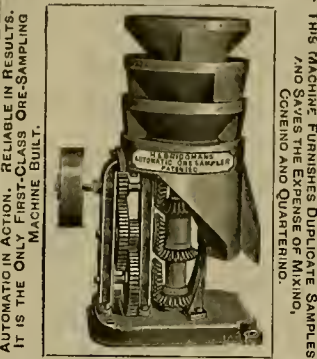
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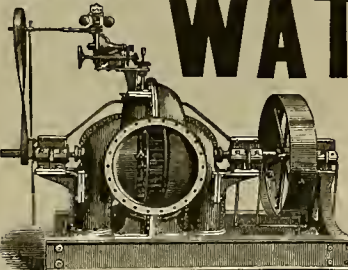
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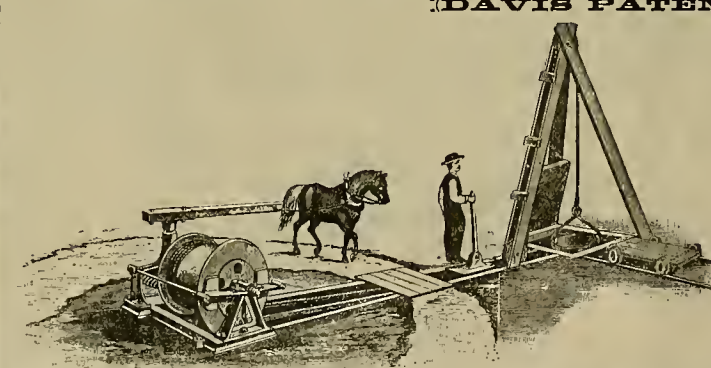
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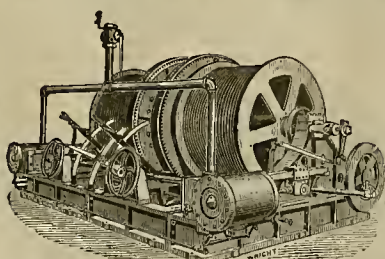
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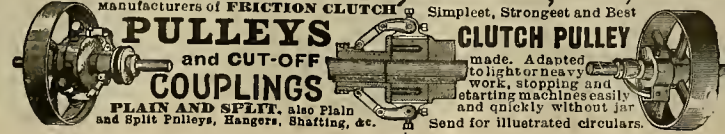
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Mechanical Progress.

Cost of Operating Cable Roads.

At the meeting of the American Society of Civil Engineers, April 19th, a paper by D. Bontecou was read on "Notes on the Cost of Operating Cable Railways," an abstract of which appears in *Engineering News*. The writer stated that the information furnished by those who have built and operated such roads has not been in proportion to the importance of the subject, and that there has been much misinformation about the net results to be expected from a cable railway, inspired by commercial interests or by the tendency to generalize without sufficient study. He therefore presented certain facts and from them drew inferences as to some of the objections to the cable system. The cost of operation for a fast and frequent service is less with the cable than with any other form of traction; and the cost of first-class construction is so large that a suitable amount of business is needed to make a cable road profitable.

The amount of gross receipts necessary to justify the expenditure of a given amount in building a road is not well understood; and the paper presented the facts as to cost of operation of a single system in Kansas City, during the last fiscal year, as representing the inferior limit of justifiable cable operation, the net earnings having been about 3½ per cent on its cost, and the average number of passengers transported daily per mile of double track, 1706. There are 8.54 miles of double track disposed as a trunk line in the business part of the city, with three diverging feeders; and the system is operated as three distinct lines, with one common terminus; about two-thirds of the territory which is served is sparsely built up. There are three driving ropes, respectively, 14,200, 29,500 and 31,000 feet long. The powerhouse is at the junction of two of the lines, and a fourth rope, 9200 feet long, is driven from a separate house.

The speed of the cars is 7.8, 9.85 and 10.25 miles per hour. There are 716' of double-track curvature, with no grades exceeding ten per cent. The rope is 1½ inches in diameter and is carried on 12-inch pulleys in a conduit 36 inches deep. The combination cars each seat 40 persons, run on two four-wheel trucks, with 22-inch wheels, and have side-bearing grips. The plant at the main powerhouse consists of an electric-light plant, with one 36x58 inch and one 32x48-inch simple, non-condensing engine, which are run alternately by three 200-horse-power boilers. The driving drums are 12 and 14 feet diameter. In the branch powerhouse there are a 24x48-inch simple engine and two 175-horse-power boilers. The equipment comprises 99 combination cars, and the system has been in operation four years. The total cost of the plant is \$1,905,989, and, exclusive of the cost of franchise and grading new streets, the cost is \$223,184 per mile.

The total cost of operation, including injuries to persons and property, secret service, general miscellaneous expenses and taxes, and all other items of expense, was \$194,241.

Total car-mileage.....	2,830,732
Number of passengers carried.....	5,318,410
Number of passengers per car-mile.....	1.9
Average number of cars run daily.....	61

This shows a net cost of 6.9 cents per car-mile, or, if interest at five per cent be added, 11.02 cents. A larger amount of business would possibly increase the cost per car-mile one-half per cent. The fuel used is bituminous Kansas coal, with about 18 per cent ash. It consists of nut and slack coal mixed in the proportion of three to two, and costs \$2.01½ per ton of 2000 pounds. The writer estimated 2.1 pounds of coal used per ton-mile, and an average of about 575 horsepower as developed by the two engines.

The total indicated engine friction is 64 horse-power, and the total resistance of all the ropes when no cars are on the line is 200 horse-power, so that the actual traction of the 61 cars with their load, aside from the friction of the rope and engine, is about 4.01 horse-power per car. The net result of 99-100 cent per car-mile for all engine and fuel expense was given. Under more favorable conditions a better showing is made by a number of roads. One line in the East reports last year 2.28 pounds of coal used per car-mile, the average load being 4½ passengers.

The cost of ropes, with the expense of grip repairs, on the Kansas City road is 1.21 cents per car-mile. On the short main line a rope lasts six months, and on the independent branch line, for two years, the approximate life for the ropes being 20,000, 55,000, 68,000 and 130,000 miles. The cables are bought on a guarantee and the

cost charged out each month. These lines could be built to-day for less money than they cost five years ago. The cost of a main line in the East, built on a perfectly straight line for very heavy traffic, with a design to secure permanence and small operating expense, having 33,000 feet of rope driven by compound condensing engines of 300 horse-power each, was \$239,240 per mile.

In the census bulletin (*Eng. News*, May 23, and Oct. 24, 1891) the cost of ten cable roads was given at prices varying from \$160,000 to \$684,000 per mile, or an average of \$350,000 per mile. But such statistics are misleading; the more usual range of cost should be from \$150,000 to \$250,000 per mile, with a service not materially less than 1000 car-miles daily per mile of double track. These figures seem to indicate additional expenses per car-mile of from 2½ to 4½ cents. To reach conclusions as to the cost of a system it is proper to consider only such as have been built without entanglement with construction companies, or incompetent engineering, and have been run with a reasonable amount of skill and economy. In this, as in all other matters of construction, skillful designing has much to do with success. There has now been enough experience to take the consideration of cable roads as business propositions out of the region of conjecture, and enable the engineer to reasonably forecast their cost, the expense of their operation, and the probable returns.

Sawing Lumber in Mendocino County.

The Mendocino *Beacon* says in reference to the Navarro mill:

"The mill at this place is running full capacity. For the month of March, 1893, the mill cut 6031 logs in 21 days' run. But now with the new logs the output of lumber is greater, and W. H. Collyer, the foreman, says he expects the output of the mill for the present year to exceed that of 1892. Probably it would be news to those interested in the lumber industry to give the output of this mill. The mill on the north side is a Stearns' latest improved band mill, with Walter Huntly of Mendocino City at the lever. The output of this mill for the week just ended is 321,568 feet, or a daily average of 53,594 feet. The mill on the south side is a Climax mill, with Frank Menier of Tomahawk, Wisconsin, at the lever. The output of this mill for the week just ended is 334,780 feet, or a daily average of 55,796 feet; making a total output for the two mills of 656,348 feet per week, and a daily average of 109,390 feet. The total output for the year 1892 was 21,215,952,342 feet, on a run of 216½ days, making a daily average for the year, 101,051 feet. This mill has made some very remarkable records. In the month of October, 1892, from the 10th to the 15th inclusive, the Stearns' mill cut 435,470 feet, making a daily average for the week of 72,578 feet; and the largest cut for one day, running one side only, was made during this week, of 84,563 feet. This record was made by Patrick Connolly at the lever. The largest output for one day with both sides running was made July 14, 1892, consisting of 80,165 feet by the Climax mill, with Oliver Lafave of Cadalah, Wisconsin, at the lever; and 60,097 by Stearns' mill, with Patrick Connolly at the lever, making a total cut of 140,262 feet. The contract taken by the Pacific Equipment Company to equip this mill with the automatic sprinkler is nearing completion, under the supervision of M. W. Spencer."

GLASS BRICK.—In Switzerland there is now being manufactured a glass brick, or a brown building block, formed or molded flask shape with short neck at each end, 8 inches in length, 6 inches in width and 2½ inches in depth, with an air chamber through the center. The edges of the brick are covered, recessed, or ribbed and grooved to receive when laid a suitable cement of plastic material of such character that, after it has hardened, it will constitute a suitable frame or setting to keep the entire mass, roof or wall solidly together. The forms or molds, there being two different shapes, are pleasing to the eye, the lines or ridges being clean and smooth and of a sufficient thickness or strength to stand a pressure of 150 to 200 pounds to the square foot.

A HINT to intending traders with China comes from the United States Consul at Hong Kong, in the shape of advice to American manufacturers. The Consul says that it is absurd to seek to introduce such machinery as saw and planing mills, mowing and threshing machines and harvesters into a country where there are no large farms, and where human labor is so cheap as to be a drug in the market.

Scientific Progress.

Matter Held in Suspension in Moving Water.

In a late issue of *Le Genie Civil*, M. Gallois describes an easy experiment for demonstrating the action of solids held in suspension in moving water.

He says, take a bottle of white glass, about three inches in diameter and with a flat bottom; put into it to the depth of about 2-10 inch, some fine and very clean silicious sand, that will not interfere with the transparency of the water, with which the bottle is then filled. Cork it in such a manner as to exclude all air. Then give the bottle a rapid movement of rotation around its own axis, either by placing it on a turn-table, or by suspending it from a previously well-twisted cord.

It will then follow that all the sand will be projected upon the cylindrical sides of the bottle by centrifugal force. The rotation movement of the bottle will gradually communicate itself to the water, progressing from the sides to the axis, and as long as rotation lasts the sand will adhere to the cylinder. As soon as the water turns with the same velocity as the bottle containing it, suddenly stop the bottle. The sand will at once quit the sides and precipitate itself toward the center of the bottle in the form of a cloud, and it will then reassemble its particles on the bottom in the form of a cone, having the same axis as the bottle, and being higher as the velocity of rotation is greater. Finally the cone flattens as the velocity of rotation grows less, until the slope of the conical surface is the slope of equilibrium of grains of sand in still water.

The explanation of these phenomena is very simple. When the movement of rotation of the bottle is stopped, the water, by reason of its inertia, continues to turn; but the friction against the sides of the bottle tends to decrease the velocity of movement, and this decrease progresses successively from the sides to the center, in such manner that the relative velocity of the liquid threads is greater at the axis or center of the bottle. The sand is pushed toward the center by a force which is proportional to the velocity of the fluid. As this velocity decreases, the force of impulse toward the center decreases, and the cone flattens out, until it assumes the shape due to still water.

Copper from Birds.

It has long been known that six or seven per cent of copper could be obtained from turacin, a crimson pigment yielded by the feathers of the turacou, the African plantain-eating bird, of which there are 25 distinct species; but some new light has recently been thrown on the subject by Professor A. H. Church, of London. Of the 25 kinds of turacou, 18—namely, all those belonging to the three genera, turacus, gallirex, and musophaga—contain, according to this gentleman, the pigment turacin in from 8 to 18 of the primary and secondary feathers of each wing. It occurs also in the head feathers and crests of some of these birds. The pigment may be extracted by the most dilute alkaline liquids, producing a magnificent crimson solution, and it has a perfectly well-defined absorption spectrum. When a single red feather is burnt, the green flash of copper can, it is stated, be distinctly seen. Only one other animal pigment containing this metal is known; that is hæmocyannin, a respiratory pigment like the hæmoglobin of blood, not a mere decorative pigment like turacin. It contains, however, but a small proportion of copper. Professor Church also mentions turacoverdin, a green pigment occurring in the feathers of some turacous, and apparently also formed by the exposure to air and moisture of turacin, or by boiling that substance with caustic soda. When turacin is suddenly and strongly heated, it gives off a crimson vapor which condenses into a crystalline substance containing both copper and nitrogen, yet quite distinct in its properties from turacin. The average composition of turacin is: Carbon, 53.69 per cent; hydrogen, 4.60; copper, 7.01; nitrogen, 6.90; and oxygen, 27.74 per cent. The presence of copper in the substance is easily accounted for by the fact that bananas, the chief food of many of the turacou birds, contain this metal. The amount of copper in the turacin of a single bird is not quite one-fifth of a grain. Did the turacous yield metal of greater value than copper it is possible that their special breeding would have proved a more remunerative proceeding than investing in many gold mines. As it is, their capacity of yielding copper is merely regarded as a scientific curiosity.—Iron.

A SCIENTIFIC STUDY of dust has proved

that the atmosphere of New York improves with every story of ascent. The window sills on the ground floor of dwellings subjected to examination were found deeply covered with dust containing all sorts of unwholesome particles. The dust was less, and not so unwholesome, on the next floor, and this improvement was continued until only a thin layer of light and comparatively harmless particles was found.

EVOLUTION IN ARTIFICIAL STONE.—By a new process artificial stone is now manufactured free, it is claimed, from the usual liability to crack or fracture. The process is described as simple, that is, silicic acid, after being ground to powder, is cleansed from all impurities by ordinary means, and five to ten per cent of it mixed up in warm river or rain water, which is either applied to slaked or well-burnt lime, or is added to hydraulic lime; the resulting product of this process, which is silicate of lime, is mixed with sand and small portions of fluorspar. This mixture may be cast into molds, so as to give various shapes, as desired, and, on being removed, the castings are allowed to dry for from 12 to 24 hours, after which time they will be as dry as atmospheric air; they are then brought into a steam boiler and steam blown through, so as to drive out all air, after which the boiler is hermetically closed up and steam let in under a pressure of ten atmospheres. In this high-pressure steam bath the stones remain for 48 to 72 hours, afterward being submitted to a bath of boiling and saturated chloride of calcium during six to twelve hours, also under a pressure of about ten atmospheres, in the same boiler, and the condensed water may be used for the bath. These stones are allowed to dry in the open air, or, when desired to dry quickly, steam may be circulated inside the boiler after the chloride of calcium has been withdrawn and before the stones are taken out. Like ordinary stones, these are readily colored or polished.—Architectural and Building Monthly.

DIAMONDFEROUS NATIVE IRON, ETC.—Influenced by Mons. Moissan's recent discoveries, Herr Nordenskiöld, the eminent Scandinavian mineralogist, has contributed to the literature of the Paris Académie des Sciences some interesting particulars concerning a piece of meteoric iron, weighing 40 kilograms, or 88 pounds, which was found at Ovipak, in Greenland, and which he had vainly endeavored to saw or cut. This extraordinary hardness Herr Nordenskiöld, in view of Mons. Moissan's investigations, now attributes to the dissemination of black diamonds through the metallic mass. Herr Nordenskiöld further remarks that in the Swedish iron mines, particularly those near Norberg and Dannemora, large quantities of bitumen are met with which form two quite distinct varieties. One, for example, yields a considerable number of distillation products and burns leaving very little ash; the other, on the contrary, similar to anthracite, yields little on distillation, but yields much ash, in which is found, besides silicic acid, iron, lime, magnesia, etc., several per cent of the oxides of nickel, uranium (3 per cent), cerium, and gadolinium. These oxides, which have so far been only rarely observed, are also present, the celebrated mineralogist asserts, in the ash of a carbon which, in the form of large nodules, occurs in the oldest sedimentary strata, namely, in the alum schists, in Sweden, and in the grahamite of North America.—Iron.

A NEW GERMAN EXPLOSIVE.—The gun trials with the new explosive substance, which commenced at Jüterbogk on Jan. 31st, on which day Herr Krupp was present, have now concluded, writes a Berlin correspondent, and some details regarding the result of the experiments and the composition of the explosive which is to replace the powder at present in use in the German army are published here.

The new explosive is chiefly composed of a kind of fatty substance and is of a brownish color. It is of the consistency of frozen olive oil, and remains in that condition up to a temperature of 50° C. The substance, which is the invention of Dr. Weiss of the Gera Dynamite Factory, explodes neither by a blow, a shock nor a spark, but by the introduction of a fresh substance. The explosion is almost smokeless and produces very little detonation. The trials have given most successful results. There is practically no recoil, even when the gun is loaded with a heavy charge, and there is scarcely any heating of the weapon. The used cartridge cases can be filled again by a simple method. The new explosive can be employed for the existing artillery, but is not adaptable to the infantry rifle at present in use. Four new models of rifles have, however, been constructed and trials have been made with them.

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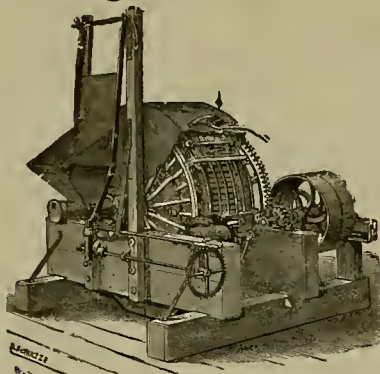
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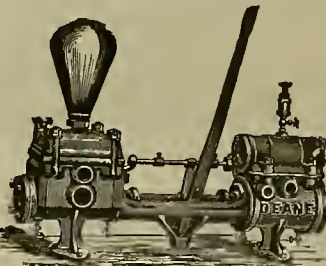
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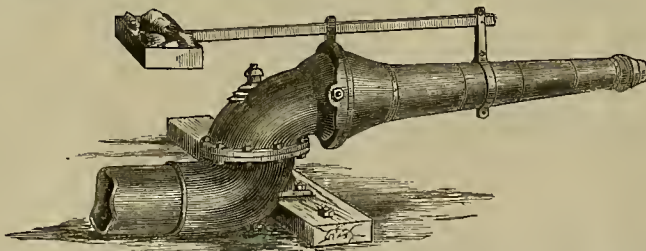
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Electricity.

Electric Buys for the World's Fair.

In the *Electrical Review* for March 12, 1892, was a very interesting illustrated description of the electrical buoys used to mark the "swash channel" at Sandy Hook. This was and is the only system of electric buoys in use in the world. Within the last few weeks a system of greater magnitude and electrical originality has been devised for use in Lake Michigan during the World's Fair, work upon which has already been commenced. This system, which is described in the *Review*, and which involves many novel features, will be one of the greatest electrical attractions at the fair. Foreign naval officers have been favorably impressed with the electrical buoys at Sandy Hook, and will probably be still more interested in the World's Fair buoys.

The peculiar situation of the World's Fair grounds with relation to the city of Chicago calls for unusual transportation facilities. In order to handle the immense crowds passing to and fro between the city and Jackson Park, and to ease up the load imposed upon the railroads, the World's Fair management decided to run a line of whaleback boats, which will carry passengers from opposite the Auditorium hotel to the World's Fair grounds. It then became necessary to mark a channel for these boats. It was at first thought that spar buoys would answer the purpose; but after it was decided to keep the World's Fair open at night, that plan had to be abandoned, and the only alternative left was to appeal to Commander J. J. Brice, U. S. N., in charge of the Ninth Lighthouse District, with headquarters in Chicago. Commander Brice communicated with the United States Lighthouse Board at Washington, requesting authority and permission to erect the required line of electric buoys similar to those at Sandy Hook. The Lighthouse Board communicated with Capt. W. S. Schley, U. S. N., inspector of the Third District U. S. Lighthouse Establishment, with headquarters at Tompkinsville, S. I. Finally Congress passed a bill appropriating \$20,000 for the installation of the World's Fair buoys. After a conference between Captain Schley and Mr. Ira W. Henry, the electrical engineer for the Bishop Gutta Percha Company, of New York, who installed the Sandy Hook plant, it was discovered that the problems involved at Chicago would preclude the use of the Sandy Hook system, the cost of the cable alone amounting to \$40,000. Mr. Henry immediately set to work and designed a new system, which is now being installed.

There will be 13 buoys located half a mile apart, extending from a wharf opposite the Auditorium hotel in the city of Chicago to the Casino wharf opposite the World's Fair grounds. The ends of this line of buoys are located about three-quarters of a mile off shore, but the middle of the line makes a wide sweep, extending two miles from shore to avoid the Hyde Park shoal. The submarine cable which will furnish the current is now being made by the Bishop Gutta Percha Company, and will be a stranded copper conductor No. 8, B. & S. G., insulated with gutta percha, with a jute bedding and armored with iron. It will be 14 miles long.

One of the chief points of novelty about this system is the fact that the buoys will be operated in series by an alternating current of 1460 volts. This cable, it is believed, is the longest submarine cable in the world carrying an alternating current of such pressure. The Columbian Exposition Company will furnish current at 2000 volts. A structure will be erected at the end of the Casino wharf in the form of a lighthouse. In this structure will be located a special converter now being made by the Westinghouse Electric and Manufacturing Company, of Pittsburgh, after designs by Mr. Henry. This converter will be used to transform the current from 2000 to 1460 volts, the pressure required on the buoy line. Besides this special converter, the lighthouse at the end of the wharf will be equipped with all necessary instruments to connect the submarine cable and the land line, together with a special Wurts non-arc lighting arrester.

The buoy is equipped with a 100-candle power incandescent lamp, and in the head of the buoy between the two horizontal iron bars of the cage will be sunk a special series converter. The connections of the cables are carried in slots sunk in the sides of the buoy and covered with strips of wood, screwed tight.

This line of buoys will mark a "fair way lane" from Chicago to the World's Fair grounds. Steamers will run up one side of the buoys and down the other. The average depth of water is 25 feet, as shown by

recent surveys made by Captain Schley and Mr. Henry from the lighthouse boat "Dahlia." The system will be in operation by June 1st.

Great credit must be awarded to Mr. Henry for the novel design of this system of buoys, which in all probability will become historic.

Storage Battery Cars on Second Avenue.

On Friday afternoon, April 21, says the N. Y. *Electrical Review*, the first public trial trip of the Second Avenue street railway storage battery cars was made and proved a success.

The car, equipped with the Waddell-Entz storage battery and motor, the body being manufactured by Brill Brothers, rounded the curve at 127th street, and started on its first trip with about 50 railroad celebrities aboard.

The batteries, 144 in number, occupy the spaces under both seats. The motor and gearing are remarkably noiseless, and the entire equipment of the car, viewed from the standpoint of a passenger, was satisfactory.

None of the storage battery cars which have been in operation heretofore has proved acceptable, the hum of the motor or the smell of the hydrogen being sufficient to condemn them in the eyes of the public, who in many cases preferred to them the present old-fashioned horse cars.

Messrs. Waddell and Entz and a corps of designers have worked together, and with their combined efforts have produced a storage battery and motor which seem to be a happy combination. The battery equipment of the cars weighs in the neighborhood of 4000 pounds, and its capacity is 350 ampere hours. In each separate cell are several pairs of plates, which weigh, together with the case and solution, about 30 pounds each. The fact that this battery is not composed of lead, and that it has not the objectionable sulphuric acid, or hydrogen fumes, recommends it as practical. The plates are iron and copper, and the solution is an alkaline salt of zinc; the voltage of the cell is about .8.

The company has a power-house at 127th street, which will soon be well equipped and prepared to furnish current for the 10 cars which will be used solely between 96th and 127 streets, to the exclusion of horses.

The motor of the car is remarkably well constructed and stands considerable hard usage. No brake is used to stop the car, but by an ingenious controller device the armature is short circuited, and the field coils are left excited. The large torque that the armature possesses enables the motor to start very quickly.

One feature of this motor is the gearing on the axle, cut with involute teeth, of a bronze made by the Waddell-Entz company, and it is a large factor that goes toward making it noiseless.

This trial trip of 31 blocks was accomplished in nine minutes, and the return to the power-house in like time. The directors of the road were perfectly satisfied with the trip, and it is possible that the entire line will be equipped with the storage battery cars, and the poor unfortunate car horse on the Second Avenue line will be relegated to perhaps some easier sphere of usefulness.

ELECTRO DEPOSITION OF COPPER.—A discovery which promises to be of great importance in the arts has recently been made in connection with the electro-deposition of copper and other metals. Heretofore these processes have been carried on by immersing the metal intended to receive the deposit in an aqueous solution of a salt of the metal to be deposited. The new process makes use of insoluble salts of the various metals, which are reduced to fine powder and mechanically mixed with water. The mixture is applied to the surface of the metal by means of a brush, to the handle of which is attached the electric conducting wire, so that the process of deposition resembles that of applying a coat of paint. Not only pure metals, but all sorts of alloys, are applied as coatings to other metals with the utmost facility by this process. The hull of an iron ship, for example, may be painted over with a tough, adherent and impervious coating of metallic copper, of any desired thickness. Experiments have been made which indicate that this process may be successfully applied to the plating of aluminum with silver or gold, a desideratum which has long been sought for, but hitherto apparently in vain. *Engineering News.*

There are three very noticeable features connected with the telephone service in England—it is controlled by the Government and under the direct charge of the postoffice department, its tolls are only about half what they are in America, and its wires are

all placed underground. That the Government looks out for its patrons as well as do the private companies in America for theirs is evident to any one who examines the service. For instance, long-distance wires are now being put down between London and Dublin, and Glasgow will soon be able to communicate with Belfast by the same means. When the lines are completed there will be a circuit taking in the cities of Dublin, Belfast, Glasgow and London.

Useful Information.

What Constitutes Millwork.

It is stated in the *Pacific Builder* that the items which make up a complete bid for mill work embraces the following: All doors, windows, transoms, sash and frames for same, thresholds, screen doors and sash, all ordinary inside and outside blinds and inside finish for doors and windows. All outside cornices, corner boards, water table, belt course, scroll work, all outside turnings, carved ornaments and verge boards when not fir. All veranda or porch post railing (when not square fir), balusters or cut work, filling below railing, arches and soffits, all molding and lattices. Wooden skylights and ceiling ash, including curbs for ceiling, ash and finish, when not fir. Inside base, angle beads, wainscot cap and paneled wainscoting put together and wainscoting, when not fir. Wooden sinks, drain boards, wash stand fronts, wooden wash tubs, capping for bath tubs, fronts for bath tubs with panels, wooden gratings for bath rooms and water closets. Material for closet shelving, drawers, hook strips, dressers and pantry finish. Posts for outside steps, including straight moulded railing and balusters and cut work under straight railing, also straight cap for buttresses of outside steps straight cedar coping. The contractor to furnish all dimensions and measurements. Alternation of repair work to be as per list of items agreed upon or furnished. All glass to be furnished (excepting metal skylight, sidewalk and store front plate, also art glass when price is not mentioned). Plain picture moulding only. The following items are not considered in a full mill bid: Rough furring or grounds for plaster work, rough arch ribs, rough brackets for iron cornices, easements for base and wainscot, capping for stairways. Ladders of any kind. Easements or crook portions of panel wainscoting. Covering for cornices, putting together of inside door frames. Twist turnouts or easements of any kind for wall coping. No patent sliding blinds or any other article which is patented. Or smoothing up of any inside finish, except which is put together at the mill.

UNLOADED BY AIR.—Advices from abroad describe a novel machine in use at Millwall docks, London, for the discharge of cargoes of grain in bulk, the principle applied being the removal of the grain by the creation of a strong current of air. The machine is erected on the barge, which is placed alongside the ship to be operated upon. To the machine is attached one end of each of six five-inch flexible pipes, the other end of each of which is carried into the hold or holds of the vessel and immersed a few inches in the grain. The engine is then started and the grain immediately flows at the rate of 100 tons an hour through the pipes into receivers, whence it falls by gravity into weighing machines, and then again by gravity into the craft sent by buyers to receive it. The machine in use has a power of 100 tons per hour, but the work done can be increased indefinitely by the addition of a corresponding engine power. The six pipes are worked together, but when necessary more or less of them can be shut off, and the rate of discharge is then reduced, but not in proportion to the number of pipes detached. With one pipe only in use the power exercised carries 38 tons an hour through it.

THE comparative efficiency of labor at high altitudes is discussed by Mr. E. Lane in the Nineteenth Century, in describing works on the summit tunnel of the Central railway of Peru, 15,645 feet above sea level. He says that up to 800 to 10,000 feet above the sea level the native laborers do about the same relative amount of work as at the sea level; at 12,000 feet the amount of work decreases, and at 14,000 to 16,000 feet a full third must be deducted from the amount the same man would perform at sea level. This applies to men brought up in the country. It takes about two weeks to accustom a man from the coast to do as efficient work at the higher altitudes, and his capacity gradually increases and reaches a maximum in a few weeks, or months, according to the constitution of the man. The majority of the

laborers are Cholos, or Indians, born in the Sierra. It takes them a long time to become accustomed to coast work. Mules and horses work well up to 17,000 feet, and in about the same proportion as the human beings mentioned. The perpetual snow line lies here at an elevation of about 18,000 feet above the sea.

LIGHTNING RODS ON SHIPS.—The methods adopted to protect ships from lightning are now so nearly perfect that it is only at long intervals that we hear of a vessel being harmed in any way from that cause. In the recently constructed men-of-war, great care has been observed in the placing of the lightning rods affixed to the masts. In some cases, branches have been run from the masts along the spars, each tipped with a solid platinum point. Several methods of sheathing are now being experimented with, and it seems that on those vessels containing a considerable amount of explosives, the rod will be run across the deck from the point where the mast enters, over the side and down to the sheathing. There can be little doubt that this will prove the safest plan yet devised. Human lives are far too precious to attempt any experimenting with, and the old motto, "In time of peace prepare for war," is especially applicable in the case of those vessels carrying magazines loaded to the decks with our modern explosives.—*Electric Review.*

TREATMENT OF LOW GRADE SILICIOUS ORES.—A correspondent writes: "The extensive additions to the reduction plants of the Broken Hill Silver Proprietary Company, of New South Wales, mark a very important epoch in the metallurgical treatment of the vast reserves of the low-grade silicious ores with which the mine abounds. To utilize the leaching plant, at present somewhat of a white elephant, Mr. Howell recommended, and the directors have approved, the erection of ten desulphurizing, chloridizing, revolving, cylinder furnaces. A lengthy series of experiments with the leaching plant has amply demonstrated the unsuitability of the lixiviation process to low grade silicious ores, owing to their diverse character and the high percentages of iodyrite and metallic silver. One of Mr. Howell's patent revolving furnaces was, therefore, erected near Brodribb's shaft about a year ago, since when 1200 tons of silicious material have been roasted and lixiviated, over 80 per cent from a 20-oz. gangue being extracted. The additional plant will be equal to an output of 300 tons of ore every 24 hours.

MAKING GLASS EYES.—In Thuringia there is a whole district which is dependent for its support on the manufacture of artificial eyes—husbands, wives and children all working together at this same means of livelihood. And yet, though these simple German village people turn out their produce by the dozen, no two eyes are ever the same. No artificial eye has its exact fellow either in color or in size in the whole world. The method of the manufacture is not a very complicated art. There are, firstly, glass plates, which are blown by gas jets, then molded by hand into the form of an oval-shaped cup. Then there is the coloring of the eyes, which is effected by means of tracing with fine needles, the tints being left to the taste of the individual worker, though the scope of their taste is necessarily limited to grays and blues and browns and blacks, which colors are assorted together before being eventually dispatched to their various destinations.

In building an earth dam 85 feet high and over 1000 feet long for the water works at Santa Fe, N. M., the upper half of the dam is puddled in layers, a herd of 115 goats having been bought expressly for puddling. These goats are in charge of a herder, who keeps them in motion when on the dam, which is stated to be from 12 M. to 1 P. M., and from 5 to 6 P. M. each day.

CONTRARY to what most persons would infer, it is said on the authority of the United States Department of Agriculture, after careful tests, that tapping the pine trees of the South for turpentine is not injurious to the timber, and that the lumber is in no way affected by it. The turpentine industry, with a product worth \$10,000,000 annually to the South, is thus a clear gain.

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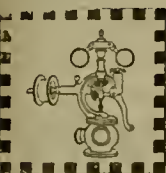
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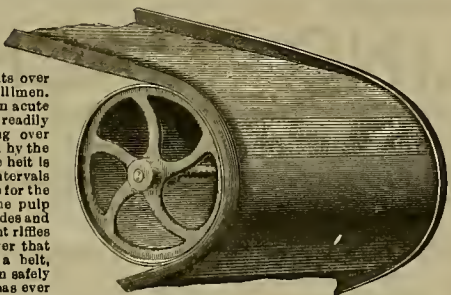


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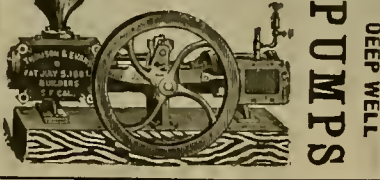
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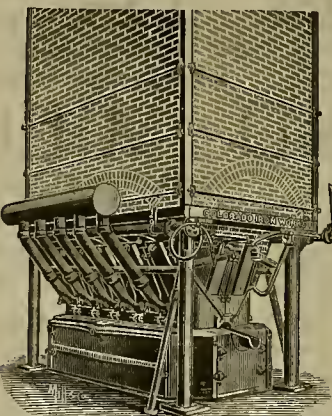
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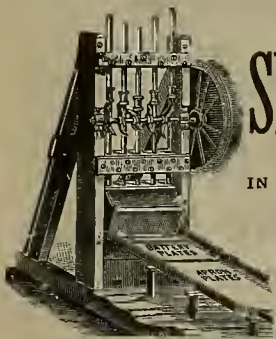
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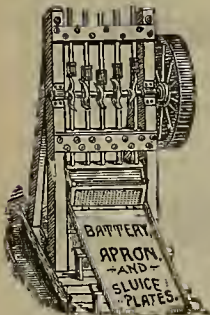
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZELE.—Amador Ledger, May 5: At the Zele the work of repairing is still going on. B. F. Taylor has had for the past week a force of men at work laying the new pipe which is to convey water from the reservoir to the mill. J. H. Tibbits, the popular and successful superintendent of the Albany Gold Mining Co., has, in addition to his other duties, assumed the position at the Amador gold mine made vacant by the resignation of J. P. Darling. Fisher and Shay, who for some time have been trying to strike the old Griselbach ledge, upon Wednesday were rewarded by finding the long-coveted lead. It proved to be about three feet wide and immensely rich, going up into the hundreds of dollars per ton.

PLYMOUTH.—Cor. Amador Ledger, May 5: Mr. Jones, the superintendent of the Bay State mine, has just returned from San Francisco, whither he has been to purchase machinery for a new hoisting works for the Bay State mine. He informs me that he bought a new 60 horse power engine and boilers, all complete, and that they were shipped last Saturday. They will be placed upon the ground in a few days, and in a short time operations on this celebrated mine will be resumed in first-class style, and in the near future the reports from this mine will compare with the other great bonanza mines of Amador county. I saw Mr. Wild, of the Wild & Wheeler mine, this morning, and he states that their five-stamp mill is still running night and day on fair-grade ore. He says the company is more than pleased with the results. A. B. Sammers, managing agent for Dr. Boyson, is pushing the work of developing the old Pioneer mine, south of the New London, with very encouraging results. V. Smith, superintendent of the Osceola, is pushing the work of development as fast as possible. He states that he thinks he will strike the ledge in a short time, and that the Osceola Company of San Francisco will be very agreeably surprised to find themselves the owner of a bonanza as rich as the now celebrated Baldwin mine, just across the river, which Mr. Smith claims is on the same chute of ore. All along the line of the mother lode from Plymouth to the Cosumnes river assessment work and prospecting is being carried on with unabated zeal, and in the near future we predict some rich development of this district.

Humboldt.

SOMMES BAR.—Blue Lake Advocate, May 6: Mr. A. Brizard and son Brousse, of Arcata, who left two weeks ago for a trip to the mountains, got back to Blue Lake the middle of this week. They made the grand rounds, going as high up as Sommes Bar. The placer mines were all in operation, with no end of water. Henry Theerman also says that this has been an unusually prosperous season for mining men. All the mines about Sommes Bar are running and apparently doing well.

Inyo.

FROM BIG PINE.—Inyo Register, May 4: The hauling of borax from Saline valley is now going on in good shape. Three teams are now constantly reducing the surplus which accumulated at the works during the unpleasant weather of February and March. Dan. Hall just broke the record on time, and John Counts knocked out the record for quantity, he having pulled in 20,400 pounds with a mixed team of small-eared mules and straight horses, numbering ten in all. H. W. Barton is in from his extensive field and shows some specimens of borax made in small cans, which is pronounced to be excellent. The impression is growing that Saline valley will soon be noted for the quantity as it now is for the quality of its borax output. I. H. Coe and Andy Fife will commence the leaching of Montezuma ore some time this week. Mr. Coe has confidence in the Montezuma property, and if their process of reduction operates successfully, excellent works will be erected at the mine in due time. S. P. Roberts of Big Pine will resume work at his Pine Mountain claims as soon as the snow will permit, and hopes to enlist capital sufficient to make that a good permanent camp. S. G. Gregg and Dick Whitaker have their sluice-boxes set at their placer claim southwest of the hamlet.

Placer.

DIVIDENDS.—Placer Herald, April 29: The old Breece & Wheeler still pays big dividends. The Hidden Treasure pays as rich as ever. Quite a large force is at work. There is a prospect of the Hogsback starting up this spring. At the Black Canyon the tunnel has been completed and gravel struck. The Red Point is not paying much at present. The Pioneer mine is paying big. Work will be resumed on the old Weske mine this spring. On Wednesday of last week the owners of the Ben Franklin mine at Yankee Jims cleaned up \$2300, the result of 150 days' work for one man. The gold is of very fine quality, being worth \$18 per ounce. Work at the Gray Eagle began on the 17th. The company intend to run a new tunnel, which will be about 4800 feet long. The pay will open up the mine at a lower level. The pay streak at the Dardanelles is irregular, as the cement shuts it off at intervals. In places the cement runs to the bedrock; wherever it lifts the pay is big. The boring machine for prospecting gravel channels is at work on the divide. The Drummond mine has temporarily shut down.

Mono.

THE BONIE STRIKE.—Bodie Miner, May 5: The Bodie stock has been quite lively during

the past week, jumping up from 25 to 75 cents and back again yesterday to 30 cents. It was reported on the streets that an important strike had been made in the upper levels. Our reporter interviewed Supt. Kelly on the subject, but all the information he got was, "it is looking well in the face." It is the general opinion here that a small vein of very rich ore has been discovered, but what it will amount to, time alone will tell.

THE STANDARD MINE will close down to-day and the mill will follow Sunday for want of wood. We understand that it will be about three weeks before operations will be resumed. In the meantime the shaft will be retimbered for 100 feet or more, and some necessary repairs will be done to the machinery at the mill and mine.

OPERATIONS have been resumed at the Summit mine. At present the force employed is small and the work done is on a limited scale.

Nevada.

THE CHARONNAT MINE.—Transcript, May 5: Colorado parties are negotiating for the purchase of the Charonnat quartz mine at Canada Hill. The property is owned by Geo. C. Gaylord. Several years ago this mine was considered one of the best in the district and employed a large force of men. It was not worked to any great depth, and the opinion of miners is that if the shaft was sunk down 100 or 200 feet deeper good rock would again be found. An expert was here from Colorado last week and made an examination of the mine. The company represents are anxious to get hold of mining property here. They mean business, and Mr. Gaylord thinks the sale will be consummated before long.

MINING AT HUNT'S HILL.—Transcript, May 6: Some very good paying gravel is being taken out at the Ah Sing Mining Co.'s mine, which lies adjacent to A. G. Turner's claim, known as the Eastern and Maine mine. There are some 16 coolies who own this mine, and during the last five years a great deal of gold has been extracted and but a very small part of it circulated this side of the Celestial soil. After a three months' run their long toms yielded the sum of about \$5000, which was far above all expenses. The mine was purchased about 12 years ago for \$3500 by this Chinese company, and since then many thousand dollars have been unearthed. The mine adjoining, owned by A. G. Turner, is located on the same lead, and the prospects at present bid fair to succeed. The gravel is very hard at present and requires to be crushed. The gravel extracted by the Chinese requires no crushing and is simply shoveled into boxes. Mr. Turner is in hopes of soon finding this same quality of gravel in his own mine, and if he does there can be no doubt as to its worth. The mill that he has erected affords him a good opportunity to prospect the dirt as it is taken out. At present the bedrock is pitching off rapidly, but the drifts are being run on a level grade with the hopes of soon finding the rock rising again. Most all the good paying ground in this locality has been on high bedrock. There is gold in all the dirt, which is an encouragement to press on.

THE DIAMOND MINE.—Grass Valley Telegraph, May 4: Mr. Thomas, the superintendent and principal owner of the Diamond mine, informs us that the work of pumping and sinking upon the property has been commenced. This is a comparatively new venture and is in a splendid district. The company will develop the prospect to its fullest extent.

CONTRACT AWARDED.—Transcript, May 2: The contract for erecting a hoisting and pumping plant on the Reward mine has been awarded to Martin Bros. & Muir, proprietors of the Miners' Foundry. The contract calls for the erection of the necessary building and all machinery, and the same to be first-class in all respects. The works will be put up as soon as possible. The owners of the Reward mean business and intend to open their property in a systematic manner.

TO BUILD A MILL.—Grass Valley Union, May 2: Last evening the Baltic Mining Company, of this city, held a meeting at the office of the company and let contracts to make machinery and erect a five-stamp mill at the mine. J. M. Lakenan, Grass Valley's foundryman, being the lowest bidder, was awarded the contract to furnish the machinery, wheels, pipe and everything complete, while Mr. Joseph Everett, the millwright, was given the contract to erect the mill, lay the pipe and get everything in working order and ready to start up. Mr. Schneider, superintendent of the mine, informed a reporter that it is expected that the mill will be on the ground and ready to commence crushing within six weeks from the present date. The contract to furnish the lumber has not been let yet, but it is most probable that it will be awarded to C. W. Kitts, of this city. Mr. Schneider feels very much elated over the future prospects of the Baltic. He says that it is looking better every day.

Plumas.

A GOON VAIN.—Plumas National, April 29: Sam W. Cheyney, superintendent of the Jamison mine, arrived in Quincy on last evening's stage. From him we learn that in making a crosscut to the southwest, from the lower tunnel in the Jamison mine, a small vein of very good ore was passed through. It is about one foot wide. The snow in the vicinity of the mine is yet quite deep and it will delay repairing the injury done by the floods early in the winter until the latter part of May. Mr. Cheyney will soon revisit Shasta county, where his company owns the Mammoth quartz mine, recently purchased by it and for which it is now securing patents.

AT SHORAS HILL.—At Shoras Hill, Henry Orr and Frank Terry are at work prospecting the Incubus gravel mine, owned by Orr, Edwards & Stephan. They are trying to find the channel supposed to have been the feeder of

the Elizabethtown and Newtown channels. Last season they put down a shaft 40 feet and found gravel 20 feet from bedrock. Recently they started a shaft 600 feet north of the other. Yesterday, very fine looking quartz gravel was reached. The company will sink another shaft between the two mentioned, with the view of thus reaching the center of the channel. The company owns 117 acres of ground, and the indications are that it will have a good mine.

WORKS COMPLETED.—The hoisting and pumping works at the Mill Shaft, about two miles above town, on the Golden Wreath placer claim, have been completed, and the work of getting the water out of the shaft is now in progress. The hoisting works are of a very substantial character in their entirety. A 10-inch pump is to be run by steam. M. S. Light has been doing most of the machine work and R. W. Young the carpentering. It is considered one of the strongest pieces of work of that kind ever erected in the county.

STRIKE IN THE HALLSTED MINE.—National Bulletin, May 6: Chas. R. Thompson came down from Spanish Ranch Monday, and brought with him a specimen of ore developed last week in the Hallsted mine on the East Branch. This piece of ore is very rich. Of course it is only a hand specimen, not shown as a sample of the great body of the vein which, on the surface, was 45 feet wide. However, it is a part of a discovery believed to be very rich, especially when the quality of ore in the recent development is viewed in connection with the vast extent of the quartz lode of which it is a part. A few years ago, a milling test (a four-stamp mill being used) of the surface ore was made, and the returns proved that it would pay. Since the time when this test was made, the Hallsted Bros. have been running a tunnel to tap this chimney 150 feet from the surface. They reached the ledge last week, and found this body of excellent ore. They will continue the tunnel to ascertain the probable length of this chimney. In due time a crosscut will be made. This immense lode has been cut by the East Branch of Feather river, and the bed of this stream is about 2000 feet lower than the present development. At the foot of the hill the vein is exposed. By running a tunnel of about 2000 feet the present chimney could be reached at a depth of 2000 feet. This great quartz lode is traceable across the mountain from East Branch to the North Fork of Feather river, a distance of over four miles. Hence it is a body of ore practically inexhaustible, and it is so located that capital could operate it very cheaply, the East Branch being the source of an unlimited amount of water or electric power for milling and mining purposes, while plenty of timber is at hand. It is the opinion of many old practical miners that the Hallsted property is one of the great future mining propositions in Plumas county. It is one of those mines that a poor man cannot equip and operate. It needs capital in the hands of practical mining men. It is a big proposition of merit, promising rich returns to a company of means to properly develop and equip it.

LA PORTE.—Cor. Plumas National Bulletin, May 6: From Supervisor McIntosh, who reached Quincy Sunday evening, we learn that the snow is yet about five feet deep at La Porte. This fact, however, does not deter the people of that pioneer mining town from making preparations to celebrate the Fourth of July. Considerable drift mining is in progress in that section. Thistle Shaft is now employing about 80 men and work is progressing very favorably. It is generally understood that the mine is paying quite satisfactorily. Undoubtedly it is a good mine and is one of the biggest gravel propositions in this part of the State. It is understood that the Claybank mine, near La Porte, has let a contract to run 1000 feet of tunnel. It is reported that Messrs. Hendell, Neff, et al., are taking good pay from the Excelsior, \$7 to the car being reported. The Suffolk is also doing well. Gould & Spencer, of Gibsonville, are doing some mining, with good prospects of success. Frank Cayot, of La Porte, is doing some work on his mine at Cascade.

Shasta.

A GOON PROPOSITION.—Redding Free Press, May 6: L. E. Rice, of Tacoma, writes to Dr. Hodson that his company is prepared to put up a plant in Shasta county, of 200 tons capacity, that will not cost any miner a cent. Mr. Rice proposes to have an interest given his company in the mines from which the ore may be supplied to the works. The process is a rapid and cheap one, and as no miner is asked to put up any money toward erecting the plant or the working of the ore, it is worthy of every consideration. Mr. Rice claims that he can work Shasta county ores up to 93 per cent, at a cost of \$2.50 per ton. Dr. Hodson has already sent him many samples from our mines. A proposal is made by Mr. Rice that a carload of ore be sent by the miners of Shasta county to his works in Tacoma, Washington, in order that they may be convinced that his process will do all that he claims. The smelting is done by electricity, and many authorities are of the opinion that this is the coming process that will solve the problem.

A LOT of mining machinery arrived this week for the Quartz Hill mine, formerly owned by Rube Clark, but now controlled by Benton Jones, of this city. Bent will have ten stamps running shortly on ore that is said to be very rich. He claims that with the appliances at hand he will be able to save nearly all the gold. Mr. Jones secures control of this mine on a bond, agreeing to pay \$20,000 for it at the end of three years, or sacrifice all improvements.

THE Gladstone mine, at French Gulch, cleaned up a \$17,000 brick as a result of the April run. The mine looks fine. Dr. C. H. Cummings, who owns the Morning Star mine, in Oregon gulch, was in town this week and reports making good clean-ups lately. W. P.

Miller, the mining man, will soon commence the erection of a plant at Middle creek, in which his new patent for saving and solidifying the slums will be used.

FROM SOUTH FORK.—Democrat, May 5: The South Fork reduction works are working ore from the Lewis mine. E. L. Bellon's mill is said to work fine. Mr. Ballon has a new concentrator, the first that has ever been sent out. R. Thistlethwaite, manager of the Crystal mine is expected back in a few days to commence work on the mine. Dunham, Martin & Co. will begin work on the Rustler in a short time. W. D. Ball is getting some fine ore out of his mine.

Sierra.

MINE SOLD.—Mt. Messenger, May 6: M. Lawler and Dan Glavin were here from American Hill this week in connection with the sale of the Mount Morlo quartz ledge below the old Pilgrim mine at that place, owned by a local company, that brought, we understand, about \$30,000. It is undoubtedly good property but lack of finances prevented the old owners from developing it. A San Francisco company is the purchaser.

THE Wide Awake Mining Company of this place has levied an assessment of five cents per share, delinquent June 6th.

TOM BASSLAR, Sam Tym and Albert Butler have leased the upper end of J. D. Newhouse's placer claim at Mobile Flat, and will immediately begin work.

Siskiyou.

ON SALMON RIVER.—Blue Lake Advocate, May 6: There have been a number of arrivals this week from the placer mines on the Klamath and Selmon, all of whom aver that the miners have all the water they want and more, and are as busy as bees. It would not be easy to enumerate the different placer mines in what is known as the Salmon river country. They are strung all along the river and the fact that the owners thereof are at work on them is pretty good evidence that they pay. Charles Leveque, a former citizen of this section but now a resident of Siskiyou, reached Blue Lake Wednesday afternoon. Mr. Leveque has been prospecting in the Salmon river country, having spent the winter, which he assures us was an almighty rough one, entirely alone. At the Fordyce mine, at the forks of Salmon, where Will McLeod, Dan McDonald, Angus McPhee and Lem Fordyce are, a lead has been struck and the prospect is encouraging. The Hennessy mine, some 20 miles from there, is in operation and, Mr. Leveque learned, is paying very well. Work in the New River mines, Trinity county, he was informed, is going forward, the Ridgeway alone excepted. The Salmon river country is full of prospectors, Mr. Leveque says, and some of them have found good locations. He himself has an excellent mine to which he expects to return after a brief vacation in this section.

Trinity.

GOON PROSPECTS.—Shasta Democrat, May 5: We had the pleasure, last Thursday of meeting Mr. Fordyce Bates of Minersville, Trinity county, who spent the day in town. He anticipates lively times in Trinity this summer, in both quartz and gravel. He believes the best gravel mines in Trinity are yet to be discovered and developed, in the cement gravel in prehistoric river channels that are now known to traverse throughout that county from northeast to southwest. A lead of that gravel was recently discovered in that county that has paid \$25 a day to the man drifting.

Tuolumne.

POCKETS.—Tuolumne Independent, May 6: Thos. Birney and Joel Hudson had the good fortune to strike a rich pocket in their mine on Bald mountain. We have heard the sum estimated as high as \$3000. We hope it is much larger. Tom says if it continues to pan out he hopes to be able to adjourn from hard work, build a nice home in Sonora, settle down and stay here. Jacksonville is coming to the front. Last week A. S. Orcutt struck a nice pocket in his mine at that place. At 100 feet from the surface, where the vein is about two inches wide, a pocket was found large enough to hold about \$500.

A MINING REVIVAL.—Sonora Democrat, May 6: It is now almost certain that the mining industry here is to be revived to an extent that will be fairly surprising, especially when the dull times of the past few years are considered. The Gem mine, near Jamestown on Whiskey Hill, being worked by the Henslee boys, is furnishing ore of high grade. We are informed that a 14-days' run yielded \$900. The Lady Washington, Richard, and New Albany mines will shortly pass into the hands of the San Francisco capitalists who have been negotiating for the purchase of them. A few minor details in perfecting title have prevented absolute purchase sooner, but now the sale is about consummated, and things are looking very hopeful for active operations on these mines in the near future. Mr. Wm. Johns, formerly superintendent of the Soudsby mine and also of the Eureka mine at Summerville, has bonded the big vein at Cherokee belonging to the Smith brothers. He has engaged to sink a shaft 200 feet deep on the vein and hoisting gear is now being erected at the Sonora Foundry for the purpose. This vein is claimed to be an extension (to the north) of the Eureka and Dead Horse mines. Tests of the ore show that the mine will pay well with the water power available. A pocket mine situated in the gold-bearing district of Brown's Flat, and being worked by T. C. Birney, Henry Munroe and George Wainwright, has been doing the grand in remunerating its hard-working owners this week. Mr. Munroe exhibited a piece of quartz in town Monday that fired glittered with gold, containing nearly \$400. By Tuesday evening \$2500 had been taken out and Wednesday morning the gentlemen resumed the easiest work ever done in a

mine—extracting gold. It is thought that the "pocket" will yield about \$4000. Work on the Belcher Consolidated mine, near Groveland, is being steadily prosecuted under the management of Frank Hill. The steam hoisting works will soon be in operation. The ore shows well in free gold and is of good paying quality. Mr. Hill has ordered one of the Blanding amalgamators. These amalgamators have been proved in practice to save the gold very closely, and the principal on which they operate is now in use in Nevada county and also in the extensive mines of Johannesburg in South Africa. They are manufactured by the Sonora Foundry. The Belcher Con. mine was sold in London on the report of Mr. Louis Blanding and a mill erected on the mine by him. The mill contains one of the Blanding crushers.

NEVADA.

Washoe District.

CON. CAL. & VA. MINA.—*Virginia Chronicle*, May 6: 1500 level—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 16th floors, above the sill floor of this level. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stope, eight floors up in the nraise, No. 6 carried up from the main northwest drift; also from the old stope in working north from the crosscut run west from the northwest drift. Have continued to stope out ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Have extracted during the week from all parts of the mine 567 cars of ore about 560 tons. Shipped to Morgan mill 662 610-2000 tons of ore. Average assay value, per railroad car samples, \$27.11. The assay value per battery sample of all the ore worked at that mill during the week (665 tons), was \$23.36 per ton. Shipped bullion to Carson Mint, assay value, \$32,090.67.

OPHIE.—500 level—Jointly with Mexican Co. continue doing necessary repair work in the west drift from the main shaft. 1565 level—The west crosscut started from the bottom of the winze, sunk 52 feet below the sill floor of this level, has been advanced 25 feet; total length, 40 feet; in a porphyry, clay and quartz formation which carries a low assay value.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 23 feet; total length, 196 feet, continuing in porphyry formation carrying clay separations. 500 level—Have continued making necessary repairs, jointly with the Ophir Co., in the west drift from the Ophir shaft on this level.

UTAH.—340 level—No. 3 West crosscut from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 14 feet; total length, 136 feet; in quartzite and clay formation of very low assay value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 14 feet, making the total length 326 feet; the face is in hard porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 13 feet, making the total distance west of the joint shaft 3156 feet; the face is in porphyry and streaks of quartz from which there is a strong flow of water.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 13 feet, making the total distance west of the shaft 3156 feet; the face is in porphyry and streaks of quartz from which there is a strong flow of water.

ANDES.—On 420 level from north drift from east crosscut No. 1 north, a west crosscut has been advanced 11 feet. Total length, 25 feet; formation in quartz and porphyry.

GOULD & CUREY.—200 level—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been advanced 14 feet; total length, 460 feet; face in hard porphyry. Sntro tunnel level—On this level we are now running an east crosscut to make connection between our winze from the 1600 level and the joint north drift.

BEST & BELCHER.—200 level—At a point in north-west drift, 230 feet from our south line, started west crosscut No. 2 and advanced same 18 feet, passing through porphyry and quartz; total length, 60 feet. 900 level—At a point in south-west drift 112 feet from west crosscut No. 3, started west crosscut No. 4, and extended same a distance of 16 feet; total length, 28 feet; face in porphyry and stringers of quartz. Sntro tunnel level—We are now running an east crosscut to make connection between the Gould & Curry winze, which was carried down by them from the 1600 level, and the joint north drift.

HALE & NOECROSS.—1800 level—Have started the new nraise in west crosscut on our south boundary, and are working on the second floor above this level. The top of raise is nearly all in quartz. Main shaft—Have started to retimber at the 1300 level, and are repairing main incline in places where most needed.

CHOLLAR.—Are repairing west crosscut, 450 level, and retimbering the top of main incline 930 level. The east crosscut near the south line, 930 level, is out 172 feet; face is in soft porphyry and clay.

POTOSI.—The north drift from east crosscut, 850 level, is out 34 feet; face is in porphyry and seams of quartz which give low assays. The nraise 80 feet south of Potosi winze, 930 level, is up 60 feet; formation in the top is porphyry. The north drift from east crosscut opposite Potosi winze, 930 level, is out 33 feet, following a 3-foot streak of quartz that gives a

fair assay. The west crosscut from south drift, 930 level, is out 14 feet, following three feet of fair-grade quartz. South raise, 1000 level, is up 20 feet; top shows five feet of fair-grade ore. North raise, 1000 level, is up 43 feet on this stope; formation in porphyry and low-grade quartz. Extracted and sent to mill the past week 541 tons and 1250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 540 tons. On hand at mill, 102 tons and 750 pounds. Average battery assays, \$22.80; average car sample assays, \$22.72. Shipped to the U. S. Mint, Cerson, 915 pounds of crude bullion.

ALPHA.—Are putting in guides and retimbering the Ward shaft between the 400 and 1800 levels.

EXCHASQUE.—Are putting in guides and retimbering and repairing the Ward shaft between the 400 and 1800 levels.

WARD SHAFT.—Are putting in guides and retimbering the shaft between the 400 and 1800 levels.

BULLION.—Are putting in guides and retimbering and repairing the Ward shaft between the 400 and 1800 levels.

OCCIDENTAL.—The main north drift on the 750 level has been extended 7 feet. Total length, 750 feet; face is in hard porphyry. The nraise above No. 2 winze in south drift, 750 level, is up to the level of the 650, and we are extending the south drift on the 650 level to connect with said nraise. The Zedig drift has been advanced 13 feet in hard porphyry; total length, 954 feet.

KENTUCK.—We continue to extract from two to three tons of ore per day from the 160 level of the average value of \$31 per ton. On the 1100 level we are extracting ore of fair grade from the stope above the track floor and have extended the main drift south 10 feet. Have started a joint west crosscut in Kentuck ground near the Jacket south line, which is now in 15 feet; face in fair-grade ore.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 37 feet; the face is in quartz, some of which gives fair assays. The south drift from No. 4 west crosscut, 800 level, is in a distance of 54 feet; formation, soft porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week, making the total distance from north line 108 feet; the face is in hard porphyry.

Eureka District.

A LUCKY STEIKE.—*Eureka Sentinel*, May 6: Ah Tone, a Chinaman who has mined with good and bad luck in this district for several years, made a rich strike in the Ethel mine, on Hoosac mountain, a few weeks ago. He had from 10 to 15 tons of ore on the dump in the early part of the week, that is stated to be worth from \$250 to \$500 per ton. We are not in a position to give details, but have been told, upon what we consider good authority, that there is considerable of the same kind of ore in sight in the mine. The mine is the property of M. McGerry.

Ferguson District.

MAGNOLIA.—*Pioche Record*, April 27: Six four-horse teams loaded ore from the Magnolia claim last Friday for shipment to Salt Lake. The ore is carefully sorted and no doubt will run high. Meikle, Parthner and Miller have again resumed work on the Jim Crow claim. The recent developments in the Monitor ground, which adjoins the Jim Crow, justify the expectation that pay ore will soon be encountered. Ten teams are on the road with lumber from the Helene sawmill. The bulk of it will be delivered at Pioche, though some goes to Bullionville. This is the first lot of teams to take out lumber in any quantity this spring. A working force of ten men is operating the April Fool mine. Work was suspended some three weeks ago on account of bad air. This is remedied now by putting in air pipes, and a big improvement in the appearance of the mine will soon be made. Harry Lawry and his partners, who recently leased the Reed Mining Co.'s property, have found a rich six-inch streak on the Central claim which runs \$120 in gold and \$40 a ton in silver. It is east of the tunnel and is a different vein to that which the tunnel develops. The steel whim for the Magnolia has arrived and is already in place ready for work. A good ore horse has recently been put on the claim, also. The owners believe firmly in the merits of their property, and are ready to back their faith by investing their cash in it.

Yellow Pine District.

GOON PROSPECTS.—*Pioche Record*, April 27: Nothing but good news is received from the Yellow Pine section of our county, and the mining interest there is gradually growing stronger and promises to develop into a genuine boom before long. There is no longer any doubt but that the Nevada Southern will push its line at once forward to Good Springs, this county, without making any material stop. Thirty miles of rails are now down, which were to have been opened for passenger and freight traffic last week. This brings the line to the Vanderbilt district, where heavier grading for ten miles than any heretofore encountered will retard somewhat the progress of the road. After that point is passed, the 40 miles remaining to Good Springs can easily be laid, since no part of it will require heavy grades, and some 25 miles run over a dry lake, the surface of which is as smooth as a floor and so hard that a band of horses driven over it leave no perceptible trail. The assertion is also made, and confidently, that the building will then continue to be pushed northeastward to the Muddy Valley, thence up Meadow Valley Wash, and ultimately connect with the Rio Grande Western at Salina, Utah. The extension of the road to this vicinity means permanent work for us hereabouts, also, and a resumption of our smelters. With the road in operation to

carry out black ore and iron ore for flintex at other reduction points, and to bring in lead ore from the south in return, there is no reason why good and permanent smelting should not be done here, and it probably will, and when begun on this basis the limit to its extension cannot be estimated. Work on the Yellow Pines mines goes on lightly. The average owner stands ready to furnish ore for shipment as soon as the road will take it, and development work without the road is expensive to such a degree that little of it is being attempted. At the Keystone gold claim not over four men have been employed for the past two months, and no ore has been shipped, though a considerable quantity lies on the dump. Freight rates have been reduced from \$30 to \$15 a ton, and will become lower as the railroad approaches nearer. A new gold mill has just been completed at the Needles, on the Colorado river, in which Mr. Blake of Denver is interested. The next shipments of ore from the Keystone will probably be made to this point, rather than to Denver, as formerly. Taylor's half interest in the property has not yet been purchased, but in all probability it will be before the option expires, which will be on the fifth of next month. The price asked for this interest is \$40,000, and the option is held by Oscar Hibbard, formerly assayer at the Keystone. Development work on the Clementina claim, near the Keystone, is also to be prosecuted now, and Messrs. Keeley, Werner and S. T. Godbe, the owners, are sanguine of making the property more than pay expenses from the start. An offer of \$12,000 was recently made for the claim and refused, though the only work done is a 12-foot shaft. This shows a strong seam of \$560 ore, however, and ore of similar character crops out for more than a hundred feet on the surface, an excellent showing all around.

Aurum District.

SOLD.—*Salt Lake Journal*, April 27: At Aurum, Davis & Sanford have sold their Lucky Deposit to Colorado parties (so I hear), and ten per cent of the purchase price is paid down. Work will soon begin on this valuable property, and it will not be long before the purchasers will reap a rich reward. I am heartily glad that Davis & Sanford have realized on their mine, as they deserve their good fortune for all their years of privation and long waiting.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MAY 2, 1893.

496,717.—GAS ENGINE MOTOR.—Den'l Best, San Leandro, Cal.
496,718.—GAS ENGINE IGNITER.—Dan'l Best, San Leandro, Cal.
496,396.—BOLT CUTTER.—E. Chaquette, S. F.
496,682.—FIRE EXTINGUISHER FOR RAILROAD CAR HEATERS.—J. F. Cowdery, S. F.
496,554.—LABEL.—W. A. Duesbury, S. F.
496,683.—PUMP.—B. Elmore, Biggs, Cal.
496,688.—FAEA RAGISTER.—S. C. Houghton, S. F.
496,689.—STEAM ENGINE.—A. Knudsen, S. F.
496,620.—FEUT PICKER.—I. W. Lord, Cne-monga, Cal.
496,576.—KNOA ATTACHMENT.—Magney & Cate, S. F.
496,530.—BICYCLE STAND.—J. R. McCurdy, Los Angeles, Cal.
496,701.—ELECTRONA.—J. F. & S. J. Sanders, Portland, Or.
496,702.—ELECTRIC ARC LAMP.—J. F. & S. J. Sanders, Portland, Or.
496,620.—CASTOR AXLE AND WHEEL.—A. C. Sanford, The Dalles, Or.
496,712.—RUNNING GEAR.—Warenskjold & Burgess, San Diego, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BEAM AND GIRDER SUPPORT.—Francesco Cavallaro, San Jose. No. 495,783. Dated April 13, 1893. This invention relates to a device for supporting the end of beams or girders which abut against other beams or girders at any angles thereto. The object of the invention is to provide an easily adjustable support for the abutting ends of beams or girders where they are attached to other correspondingly shaped beams or girders and at any angle thereto without cutting away or weakening the abutting beams. This device may also be used to support the ends of abutting wooden beams in place of the stirrup ordinarily used.

STEAM BOILER.—Lars A. Olsen, Oakland. No. 495,829. Dated April 13, 1893. This is one of that class of steam boilers in which water tubes with hollow heads are located in the furnace shell, and are surrounded by and communicate with suitable water and steam drums. The invention consists in the novel construction and arrangement of the shell, the inclined water tubes therein, the hollow heads of said tubes, the inclined water drums and the steam drum and feed pipes. The object of the invention is to provide a boiler having a maximum capacity of steam storage, rapid in its steam generation, economical in its fuel consumption, and having great strength and durability.

FRUIT-PITTER.—Enoch W. Weare, Selma, Fresno Co., assignor of two-thirds to E. H.

Tucker of Selma and S. C. Bolling of Alameda. No. 495,860. Dated April 13, 1893. This is one of that class of fruit-pitters in which a vertically moving knife descends upon the fruit, which is snitly supported beneath it. The invention consists essentially in the novel construction and arrangement of the separable spring knives with their expandible pit-receiver, which together form not only a support for the fruit against the action of the upper knife, but also a cutter for the under side of the fruit, a separator for removing the cut flesh from the pit, and a discharger for said pit.

FIELD OF LAWN MOWERS.—David M. Miller, Fairfield, Solano Co. No. 495,825. Dated April 13, 1893. This invention relates to that class of mowers in which the motion of the sickle is derived by power from what is known as a "scroll wheel." The object of the invention is to provide a simple and effective mower for either field or lawn work, having great power, rapidity in operation, and capable of being quickly and easily adjusted and guided.

WATERING-CART.—Harry E. Fairman, Bakersfield, Kern Co. No. 495,792. Dated April 13, 1893. The invention relates to the general class of watering-carts especially adapted for the sprinkling of country roads. It consists essentially in the combination of a traveling wheeled structure, a pump carried thereby and having its suction in communication with an extraneous continuous body of water, such as in a ditch alongside of the road, discharges from said pump to deliver the water upon the road, and power-transmitting connections between the wheeled structure and the pump whereby the latter is operated by the power derived from the traction of the former. The object of the invention is to provide a watering-cart adapted to travel along a road beside a ditch, and having means connected with it for taking the water from the ditch and discharging it upon the road.

CAN BODY MAKING MACHINE.—John H. Murch and James A. Gray, assignors to R. D. Hume, Gold Beach, Or. No. 495,426. Dated April 11, 1893. This apparatus consists of mechanism by which sheets of metal are delivered first to devices by which the edges of the sheets are turned so as to be afterward interlocked and then advanced between a cylindrical horn and an inclosing sheath which forms a cylindrical body, means by which the meeting edges are interlocked, the ends made even and the seams compressed and closed; a device for supplying acid to the seams, a solder trough over which the seam of the can passes, hinged soldering irons so disposed that they dip into the melted solder and are lifted and drawn above the seam as the can passes beneath them so as to hermetically close the seam, after which the can body is delivered complete and ready for further operations.

PENCIL HOLDER AND SHAPE.—Ralph Mazza, San Leandro. No. 496,269. Dated April 25, 1893. This is a pencil holding and sharpening device consisting of a metallic tubular case having an expandible elastic holding end, a conical steel center with closed point and discharge opening near the point, an open slot in the exterior case corresponding with the discharge openings of the center, and an annular disk fitting within the case and surrounding the point whereby the letter is supported and retained centrally within the tube.

AUTOMATIC CAR VENTILATOR.—Thos. L. Merrill, Oakland. No. 496,270. Dated April 25, 1893. The invention relates to the class of ventilators for cars, and consists in an externally located casing communicating through a suitable opening or passage with the interior of the car, and having an automatically operating valve, interior circuits air passages and dust and cinder receptacle. The object of the invention is to provide a means for automatically forcing air into cars, clear of dust and cinders.

SMELTING FURNACE.—Edwin G. Smith and Benj. B. Brewer, S. F. No. 496,235. Dated April 25, 1893. The object of this invention is to provide certain improvements in this class of furnaces whereby the air which is used as a blast is heated in a peculiar manner before being discharged into the furnace through the tuyeres. An improvement is made in the bottom of the furnace whereby there is less loss of heat, and the furnace can be easily and quickly cleaned and overhauled without pulling it down, and the gases and products of combustion are condensed and saved after leaving the furnace.

TAP AND FAUCET.—Mattie Z. Farrington, S. F. No. 496,301. Dated April 25, 1893. The invention relates to that class of taps and faucets in which the permanently seated hushing is controlled by a rotary plug which is operated by the faucet pipe removably engaging therewith. The object of the invention is to provide a simple, economical and effective tap and faucet adapted for use with any liquid-containing vessel, but more especially applicable to beer kegs.

WHEEL FOR SINGLE-TRACK RAILWAYS.—John J. Burt, Tres Pinos, San Benito county, assignor of one-half to M. P. Minor, S. F. No. 496,293. Dated April 25, 1893. This invention is specially based upon the patent granted to David B. James, Oct. 8, 1878, No. 208,738, for a single track railway. The improvement consists in forming the broad single wheels in two independent parts, one of which is moveable upon the shaft, and in mounting the wheels upon swiveling trucks instead of swiveling each wheel independently. The patent also covers certain details of construction. By constructing the wheels with the two independent halves, one of which is movable, the movable portion will yield while the car is passing around short curves and will thus relieve the strain and friction.

tion which would otherwise take place on account of the great width of tread necessary to support and balance the car upon the single track.

TRAVELING HARVESTER.—Benjamin Holt, Stockton. No. 496,311. Dated April 25, 1893. This is an improvement in the apparatus designed to cut, thresh, clean and sack grain. The object of the invention is to enable a traveling harvester and thresher to be used upon sidehills of any description and maintain the frame of the harvester and cleaner at all times in a horizontal position, and at the same time maintain the bearing wheels in a vertical plane. It has also for its object the application of a suitable mechanism by which the position of the bearing wheels with relation to the frame may be changed to suit the varying declivities over which the machine may pass.

TRACE BUCKLE.—Ogden Mallory, Auburn, Plecker Co. No. 496,319. Dated April 25, 1893. The object of this invention is to provide certain improvements in the construction of buckles, links, wear-plates and connecting parts which are used to unite the traces used in light or heavy harness to the main portion of the harness. It consists in certain details of construction whereby the trace-connection between the vehicle and the collar is easily lengthened or shortened; wear-plates are introduced at points where there is a tendency to chafe the trace, and the parts of the buckle are easily dismounted or assembled.

GAS-ENGINE MOTOR FOR CARS.—Daniel Best, San Leandro. No. 496,717. Dated May 2, 1893. The object of this invention is to provide a simple, compact and effective mechanism by which the power of a pair of gas engines may be applied simultaneously to either one of the wheel axles of a car, and a means by which the application of the power to one pair of the wheels will drive the car in one direction and its application to the other pair will drive it in the opposite direction. This improved motor was described and illustrated in the MINING AND SCIENTIFIC PRESS of April 1, 1893.

GAS-ENGINE IGNITER.—Daniel Best, San Leandro. No. 496,718. Dated May 2, 1893. This invention consists of stationary and oscillating arms by which contact is made and broken within the ignition chamber of a gas engine, with means for adjusting the arms with relation to each other. A spring connection is made with one of the arms which allows it to yield, and which returns it instantly to its normal position as soon as the other vibrating arm has passed it. This spring is long and contained in a chamber which is protected from the action of the heat in the explosion chamber, and it does not lose its temper or become distorted.

PUMP.—Benton Elmore, Biggs, Butte county. No. 496,683. Dated May 2, 1893. The invention relates to a pump apparatus in which the body of water to be raised is divided in such a manner that the weights upon each side approximately balance each other. The peculiar form and connection of the two sections of the pump are such that the water is delivered into the top of the pump and a siphonic action is produced when the vacuum is formed by the separation of the two to fill the pump chamber.

STEAM ENGINE.—Augustus Knudsen, S. F. No. 496,689. Dated May 2, 1893. The object of the present invention is to provide an engine in which a crank-shaft extends through the outer casing or cylinder, having cranks in the interior which connect with a moving piston or pistons, and to provide a means for making suitable connection between the fixed crank-shaft, which enters through the sides of the exterior cylinder or case, and the interior parts while maintaining a properly packed joint around the crank-shaft. The application may also be made to a single reciprocating piston, and where two are used the steam may be employed either at high pressure in both cylinders or it may be used expansively from one to the other.

FARE REGISTER.—S. C. Houghton, S. F. No. 496,688. Dated May 2, 1893. The invention relates to that class of fare registers in which a series of periodically rotating disks is operated by means of electrically-actuated mechanisms operated from suitably-disposed switches throughout the car. The object is to provide an accurate, compact, simple, rapid and easily operated machine for registering numbers for any purpose, such, for example, as registering the collection of fares in street cars; also to provide an electrically-operated registering mechanism, and particularly such a mechanism as will be adapted to make both the trip or partial or total registrations required in a machine for use on street cars.

FLAME EXTINGUISHER FOR RAILWAY CAR HEATERS AND LIGHTS.—Jabez F. Cowdery, S. F. No. 496,682. Dated May 2, 1893. The object of the invention is to provide a means for extinguishing the fire in or from a railway car-heater or light, and to extinguish the lights of the gas-burners the moment an accident takes place, thus averting the serious conflagration which so often follows collision and other accidents, and also to make these means entirely automatic and dependent on the impact of the collision or upon the movement of the car in being thrown from the track.

Sampling Works for Sale.

The works are situated at Daguerre, Cal., in the Calico Mining District, and on side track of the Atlantic & Pacific Railroad. They contain a first-class 50-horsepower engine and 45-horsepower boiler with a 10-ton crusher and other machinery. Mill stones, as ailing outfit, etc., all new and complete. Also upon the premises a fine building and a comfortable dwelling-house (portable). The above can be had at a bargain. Apply to JOHN H. GILLESPIE, 1914 Stockton St., San Francisco.

Market Reports.

The Markets.

SAN FRANCISCO, May 11, 1893.

Postponement of the Monetary Conference until November is announced. It is looked upon as another indication of the President's purpose to call Congress to extra session early in the fall, and has been insisted upon by some of the European delegates to the Conference, so that a definite proposition on the silver question should originate with the United States. The assembling of Congress in extra session to September will afford time for the intentions of that body, in regard to the Sherman law, and the silver question generally to be clearly made known before the meeting of the Conference. It is thought quite possible that, upon the action of Congress, may depend upon the question whether the Congress will reconvene. It is now said that Governor McCreary, of Kentucky, will be unable to serve on the Commission. He has been led to this conclusion, in part by the fact that Mrs. McCreary's health will not permit her accompanying him abroad.

Copper Supplies and Product.

Stocks of copper to Europe on the 1st of May, including quantity afloat, are reported at 52,100 tons, a net decrease of 3000 tons during the month of April. More than one half of the supply is Chile copper. As the product of Chile for 1892 was less than 23,000 tons, it follows that the stock includes a quantity carried over from the previous year. Most of the Chile copper is in England, and some of it must be of inferior quality. France is a small holder of Chile copper. Four years ago she held 31,000 tons, while on the 1st of April, 1893, the stock was only 4875 tons. Recently there have been some heavy transactions in this country in Michigan copper. It is claimed that the Calumet & Hecla Company made a contract last month for the delivery of a large quantity of copper at 11c on the Atlantic seaboard. This quantity has been estimated at 10,000,000 lbs. It may have been more. The sale has steadied the market very materially.

The world's product of copper for 1892 has been estimated as follows in tons of 2240 lbs:

United States, tons	152,636
Spain and Portugal	56,170
Chile	22,565
Japan	18,000
Germany	17,560
Mexico	7,318
Australia	6,500
Cape of Good Hope	5,950
Russia	4,300
Other sources	18,615

Total 1892	310,011
In 1891	277,969
In 1890	268,959

The greatest increase has been in the American product, which for 1891 was 126,839 tons, against 115,669 tons for 1890. Last year this country produced about one-half of the world's copper. The consumption nearly keeps pace with the yield, and prices insure a fair profit to the large producers.

Three Years' Gold Product.

The latest report by the Director of the United States Mint gives the following as the total production of gold by all the mines in the world for the last three calendar years:

1890	\$113,149,600
1891	120,518,800
1892	130,816,600

These figures indicate a steady increase in the production of gold, the gain for the last year being 8 1/2 per cent. Of this increase for 1892 one-fourth part was from the mines of Australasia and the rest from South Africa. The product of the latter reached the total of \$22,069,578 for last year, which is about equal to the gold production of Russia, and makes that region second only to the United States and Australia.

San Francisco Metal and Coal Market.

ANTIMONY.				STEEL.						
Per lb.	—	@	14	English, lb.	—	@	18			
BORAX.				Canton tool.				—	@	84
Refined, in car lots	—	@	7 1/2	8" Diam d tool	8 1/2	—	@	15		
Powdered, do.	—	@	7 1/2	Pick & Hammer.	10 1/2	—	@	10		
Concentrated, do.	—	@	6 1/2	7 1/2" Maching.	7 1/2	—	@	4		
All grades jobbing at advance.				Toe Calk.				—	@	4 1/2
COPPER.				TINPLATE.						
Bolt.	—	@	22	—	B. V. steel grade.	—	@	5 7/8		
Sheeting.	—	@	22	—	14x20, spot.	—	@	5 7/8		
Ingots, jobbing.	—	@	14 1/2	—	Barroco, 14x20.	—	@	5 7/8		
Do, wholesale.	—	@	13 1/2	—	Do roofing, 14x20.	—	@	5 7/8		
Pure Box Sheets	—	@	22	—	Do, do, 20x28.	—	@	11 7/8		
IRON.				PIG TIN.						
Bar, base.	—	@	3	—	Spot Pig D.	—	@	24		
Norway, base.	—	@	4 1/2	—	Spot Pig D.	—	@	24		
PIG IRON.				COAL.						
Eglington ton.	—	@	22 00 1/2	—	SPOT FROM YARD—PER TON.	—	@	28		
Glenbrook.	—	@	25 00 1/2	—	Wellington.	—	@	38 00		
Am. Soft, No. 1.	—	@	25 00 1/2	—	Greta.	—	@	7 50		
Oregon Pig.	—	@	20 00 1/2	—	Nanaimo.	—	@	8 50		
Puget Sound.	—	@	20 00 1/2	—	Gilman.	—	@	8 50		
Olay Lane White.	—	@	23 00 1/2	—	Seattle.	—	@	8 50		
Langdon.	—	@	24 00 1/2	—	Ocos Bay.	—	@	8 50		
Thorndale.	—	@	25 00 1/2	—	Canal.	—	@	8 50		
Gardner.	—	@	24 00 1/2	—	Egg hard.	—	@	12 50		
Sarow.	—	@	24 00 1/2	—	Walled.	—	@	7 25		
Carroll.	—	@	24 00 1/2	—	Scotch Split.	—	@	8 50		
CHROME IRON ORE.				Brymbo.				—	@	8 50
Per ton.	—	@	10 00 1/2	—	West Hartley.	—	@	8 50		
LEAD.				TO LOAD—PER TON.						
Pig.	—	@	10	—	4 1/2 Australian.	—	@	37 1/2		
Bar.	—	@	10	—	4 1/2 Liverpool Steam.	—	@	30 1/2		
Sheet.	—	@	10	—	7 1/2 Scotch Split.	—	@	6 1/2		
Pipe.	—	@	10	—	6 1/2 Cardiff.	—	@	6 1/2		
BITUM.				Lehigh Lump. <td>—</td> <td>@</td> <td>11 00 1/2</td>				—	@	11 00 1/2
Drop, sizes smaller than B.	—	@	10	—	Cumberland.	—	@	12 00 1/2		
Do, do, of 25 lbs.	—	@	1 80	—	Egg hard.	—	@	12 00 1/2		
Do, do, B and larger sizes.	—	@	2 00	—	West Hartley.	—	@	7 50 1/2		
Do, bag 1 1/2 lbs.	—	@	1 80	—	—	—	—	—	—	—
Do, bag 2 1/2 lbs.	—	@	2 00	—	—	—	—	—	—	—
Do, bag 3 1/2 lbs.	—	@	2 00	—	—	—	—	—	—	—
LUMBER.				COKE.						
Home trade, pr.	—	@	42 50 @ 43 00	—	English, to load.	—	@	10 10 1/2		
task.	—	@	42 50 @ 43 00	—	Do, spot, in bulk.	—	@	10 00		
—	—	@	42 50 @ 43 00	—	Do, in sacks.	—	@	11 50		
—	—	@	42 50 @ 43 00	—	Cumberland.	—	@	8 50 1/2		

Eastern Silver Markets.

NEW YORK, May 4.—Following are the closing prices for the week:

Silver in—					
London.	N. Y.	Copper.	Lead.	Tio.	
Thursday.....	38 1/2	83 3/4			
Friday.....	38 1/2	83 3/4	11 00	3 97 1/2	20 60
Saturday.....	38 1/2	83 3/4	11 00	3 97 1/2	20 60
Monday.....	38 1/2	83 3/4	11 00	3 97 1/2	20 50
Tuesday.....	38 1/2	83 3/4	11 00	3 85	21 40
Wednesday.....	38 1/2	83 3/4	11 00	3 82 1/2	

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ. AND SALE.	SECRETARY.
Alta M Co, Nev.	43	150	April 25, May 31, June 21		L. Osborn, 363 Montgomery
Belle Isle M Co, Nev.	18	100	March 21, May 1, May 25		J. W. Fow, 310 Pine
Bullion M Co, Nevada	41	250	April 13, May 17, June 7		R. E. Grayson, 331 Pine
Bullion M Co, Nevada	34	250	April 17, May 21, June 13		O. E. Elliott, 369 Montgomery
Cons Imperial M Co, Nevada	3	200	March 20, April 25, May 17		O. J. McCoy, Mills Building
Evening Star M Co, California	8	100	April 11, May 13, June 8		J. J. Scoville, 321 Sansome
Golconda M Co, Cal.	3	50	March 9, April 24, May 18		D. M. Kent, 330 Pine
Gould & Curry M Co, Nev.	21	250	April 10, May 15, June 6		A. D. Durrow, 369 Montgomery
Gray Eagle M Co, Cal.	34	250	April 5, May 10, May 30		O. C. Harvey, 3 S. Montgomery
Jackson M Co, Nev.	14	200	March 23, April 25, May 17		O. S. Jones, 350 Pine
Jackrabbit M. & M. Co., Nevada	3	50	March 27, May 12, June 1		T. Wetzel, 320 Sansome
Lady Washington Cons M Co, Nevada	8	100	April 18, May 23, June 13		L. Osborn, 369 Montgomery
Nevada M Co, Nev.	25	100	March 24, April 28, May 22		J. W. Fow, 310 Pine
North Belle Isle M Co, Nevada	23	100	April 17, May 23, June 21		J. W. Fow, 310 Pine
Overman M Co, Nevada	23	200	May 5, June 8, June 26		C. D. Edwards, 414 California
Pine Hill M Co, Cal.	2	300	March 22, April 27, May 24		O. A. Hare, Pier 5, Stewart
Siackyou Cons M Co, California	6	100	April 28, June 1, June 23		E. F. Stone, 308 Pine
Union Cons M Co, Nev.	17	100	March 24, April 26, May 16		A. W. Hare, 369 Montgomery
Valencuela M Co, Mexico	1	100	May 5, June 8, June 26		A. E. Bull, 421 California
Yellow Jacket M Co, Nev.	24	250	March 10, April 14, May 18		W. H. Blawell, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Christy M Co, Utah	Annual	G. R. Epleny, 310 Pine	May 15

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bullion Cons M Co, California	5	L. Osborn, 363 Montgomery	Oct 29
Champion M Co, California	15	T. Wetzel, 320 Pine	April 17
Cons New York M Co, Nevada	10	O. E. Elliott, 369 Montgomery	Feb 15
Great Western Quicksilver M Co.	25	A. Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	25	D. M. Kent, 330 Pine	March 20
Pacific Coast Borax Co, California	100	A. H. Clough, 230 Montgomery	Jan 10
Standard Cons M Co, California	10	J. W. Fow, 310 Pine	Dec 23

Mining Share Market.

The stock market has not been so active this week as it was last, but still business has been pretty good for the brokers. Mr. Mackay's expected visit to the Comstock has been postponed so he will go to the World's Fair first and then come back to look after the Comstock and Vanderbilt mines. The feature of the week has been the sales in Potosi and Chollar. In the former mine the air connection on the 950-foot level has at last been made so they will be able to go after that six-foot vein of high-grade ore. In this connection the *Report* says: There is this peculiarity about the Comstock market, that a good development of ore in one mine exerts a strengthening influence upon the shares of all other mines along the great lode. Should the developments of ore which are now under way in the Potosi and Chollar mines result as favorable as the friends of those properties think they will, the stock sellers will find it hard to hold the other stocks down, for the public will buy them indiscriminately and without regard to real merits. The higher the prices of Chollar and Potosi advance the greater the demand will become for the other stocks. It is hard to control speculation when it is once started.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, May 11, 1893.

9:30 A. M. SESSION.

200 Andes	460	300 Hale & Norcross	95c
50 Belcher	33	300 Ketchikan	25c
200	130	200 Mexican	1.70
300 Best & B.	150	300 Occidental	1.15c
100 Bullion	450	200	1.00
100	450	200	2.50
100 Chollar	130	200 Overman	3c
450 Chollar	130	200 Peerless	.95c
1200	130	1300 Potosi	3.05
500 Con. N.	100	350	3.00
500 Crown Point	300	300 Sawyer	1.10
500 Con. Cal. & Va.	240	40 S. Belcher	.20c
30	240	50 Sierra Nevada	1.35
125	235	50 Union	1.25
100 Eschschuer	150	50 Utah	1.00
300 Gould & Curry	1.05	50 Yellow Jacket	1.00

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No. 530 California Street,
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Certificate of Copartnership.

WE CERTIFY THAT WE CONSTITUTE A PARTNERSHIP transacting business in this State. Its principal place of business is San Francisco, California. Its name is CONNOR & GRANT. The full names and respective places of residence of all its members are Samuel B. Connor, residing at San Francisco, California, and Andrew S. Grant, residing at San Francisco, California. SAMUEL B. CONNOR. [SEAL] ANDREW S. GRANT. [SEAL]

July 12, 1890.
State of California, City and County of San Francisco.—ss: On this 12th day of July, in the year one thousand eight hundred and ninety, before me, George T. Knox, a Notary Public in and for said City and County, duly commissioned and sworn, personally appeared Samuel B. Connor and Andrew S. Grant, known to me to be the persons described in, whose names are subscribed to, a deed who executed the within and annexed instrument, and they acknowledged to me that they executed the same.
In witness whereof, I have hereunto set my hand and affixed my Official Seal, the day and year in this Certificate first above written.

GEORGE T. KNOX, Notary Public.

I, M. C. HALEY, County Clerk of the City and County of San Francisco, State of California, and ex-officio Clerk of the Superior Court in and for said City and County, hereby certify the foregoing to be a full, true and correct copy of the original Certificate of Copartnership of Samuel B. Connor and Andrew S. Grant, filed in my office on the 12th day of July, A. D. 1890.
Attest my hand and seal of said Court, this 20th day of April, A. D. 1893.

M. C. HALEY, Clerk. By Wm. H. Lyman, Deputy Clerk.

[Seal of Superior Court.]

NOTICE OF ASSESSMENT.

GOULD AND CURRY SILVER MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of works, Virginia, Storey County, Nevada.

Notice is hereby given, that at a meeting of the Board of Trustees, held on the 1st day of April, 1893, an assessment (No. 71) of Twenty-five cents (25c) per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 69 Nevada Block, 309 Montgomery street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1893, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 1st day of June 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.
By order of the Board of Trustees.

ALFRED D. DUNN, Secretary.

Office—No. 69 Nevada Block, 309 Montgomery street, San Francisco, California.

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I am desirous of obtaining a position as Mining Superintendent. I am a graduate of the Columbia School of Mines, and have had 15 years practical experience as superintendent of mines and mill's. Special experience as expert in concentration and amalgamation.

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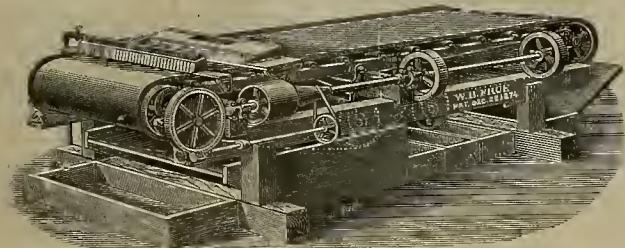
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Office of General Manager,
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I am, my Dear Sirs, Yours faithfully,
S. HARRIS, Manager

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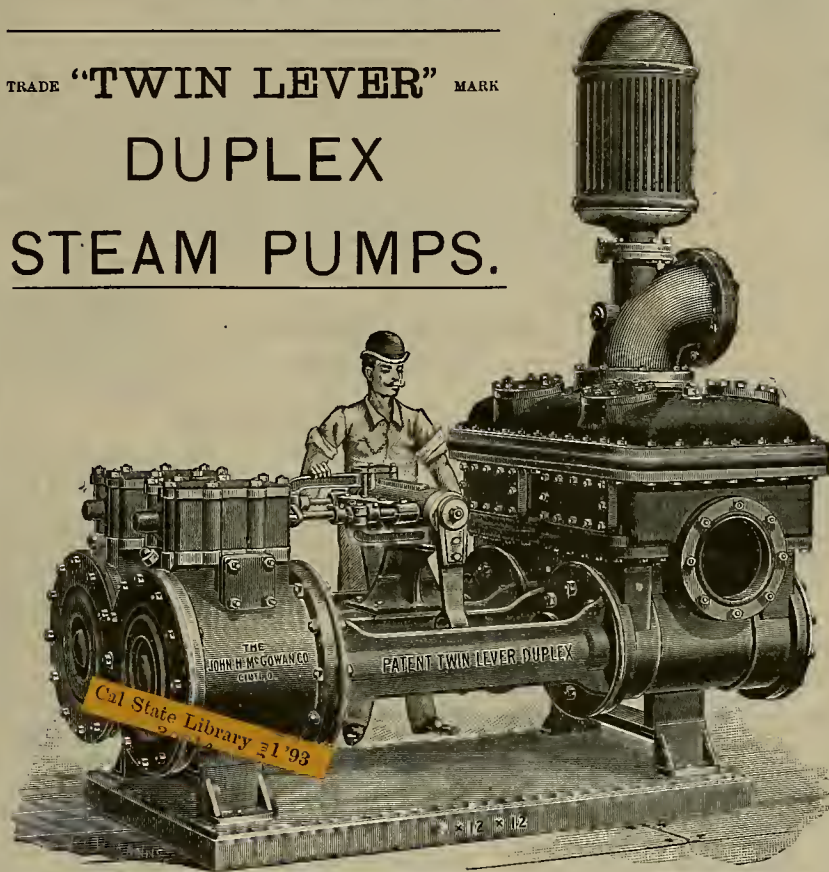
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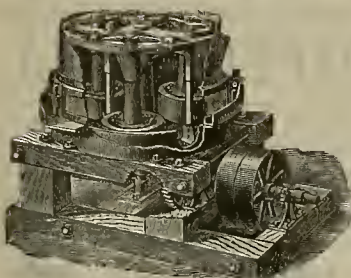
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VOL LXVI - Number 20.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 20, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Schools of Assaying and of Mines.

Los Angeles people are agitating the establishment in that city of a school of mines, which it is thought will be of great benefit to the city and at the same time assist in developing properties. It is desired to give instructions in assaying, mining, metallurgy and mining engineering. One gentleman in expressing his desire for the assaying school says it is difficult under existing conditions to get a satisfactory assay of specimens of rock found near Los Angeles, and in some cases it has been necessary to send them to the eastern States, or even to Germany, in order to secure an assay that could be relied upon. Such a statement as that is arrant nonsense. There are dozens of perfectly competent assayers, chemists, analysts and metallurgists in San Francisco, and numbers of them in all the mining towns of this State and coast. Why an eastern assayer should know more than one in a mining region is not apparent. The "rocks" around Los Angeles are no different from any other rocks, and there are doubtless competent assayers in that city who are perfectly reliable. The same wise-acre who has to send East for assays says in relation to the proposed mining school: "Assay work, such as would cost an extravagant sum if sent abroad, could be done at the school at a minimum expense, and at the same time the pupils would have the benefit of the knowledge received from watching it. Instructors of the sort that would be wanted would command large salaries, but he thought that the institution could secure their services at a comparatively small outlay by having them come with the understanding that they should receive a share of what should be paid the school for the assays made."

This is mere nonsense. Teachers would be hard to find who would take, instead of salary, a share of what was received for assay work, especially assay work done by students. If people want valuable assays, such as this man cannot now get in California, they assuredly would not expect them from young men and boys learning the business. They would go to experienced men.

Moreover, an establishment for teaching assaying is not usually called a "School of Mines." There are half a dozen or more such places in San Francisco, and there are now more assayers than can find places. The editor of this paper only last week sent an assayer to a mine where he is to receive but \$50 a month and board, and there were half

a dozen ready to take the job. Nearly all the big mines have their own assayers, and in every camp there are several.

None of the gentlemen interviewed by the Los Angeles paper appear to have been aware of the fact that there is now a school of mines supported by the State of California and in full operation, free to any one who wishes to enter. At the University of California is a department of mining and metallurgy, one of chemistry and one of geology and mineralogy.

Not only is assaying taught, but analysis of ores, geology, mineralogy, mine surveying, mining engineering, mining and metallurgy. All the necessary appliances are provided, including a stamp-mill, concentrators and other

Freight on Street Railways.

The city attorney of the town of Colton, San Bernardino county, has reported to the Council that the Southern California motor road had a franchise only as a street railway and cannot use steam nor haul freight. The attorney was instructed to prevent the hauling of freight in the future. Doubtless many other street railroads are in the same legal fix, and it would be to somebody's interest to prevent them hauling freight. This being the case, it will be well for all those asking franchises in the future to mention the freight, so that they may be permitted to carry it if desirable.

Most suburban roads, whatever their power, could be made more useful and profitable if they could carry freight. Even in large cities, like San Francisco, the cable roads, which reach in every direction, could carry freight at night to advantage by having suitable cars. Thousands of tons of freight landed from ships or cars could be transported from wharves or depots, back to the populous settlements of the city. It would be much cheaper to do this on the cable roads than by teams. No provision was made for freight, however, in the franchises, and the powerful teaming interest of the city prevents the roads doing anything but a passenger business.

In the country,

however, and on suburban routes provision should be made for transporting freight and merchandise as well as passengers. It would be for the interests of each community, but in asking for passenger franchises the companies have overlooked the possibilities of the freight proposition. Some of these roads run for many miles out back of the cities and towns and could carry supplies which now have to be hauled by teams.

Public policy would seem to demand some legislation which would permit these roads to carry freight and merchandise if they desired to do so. The roads are for the convenience of the public and the present restrictions are in the direction of maintaining high rates on supplies. With the poor country roads now prevalent teaming is comparatively expensive and slow. But well-equipped electric roads would deliver supplies, merchandise and take back products as well as carry passengers. This would benefit the public by cheapening cost and furnishing a means of quick delivery, and it seems absurd that some little legal technicality should prevent the use of the electric cars for this purpose.



BROWN-ALLEN IMPROVED O'HARRA ROASTING FURNACE. (See page 307.)

mining machinery. These facilities are open to students from any part of the State. There is a magnificent typical collection of rocks, ores, minerals, crystals, etc., for the use of students.

With such an institution in full operation we can see no need of a school of mines at Los Angeles. If it is necessary to teach the local youth assaying an assaying school is readily formed, but to create a complete school of mines and equip it, is no small matter. Moreover, while there are, of course, plenty of mines in southern California, there is not one there where there are a hundred north of San Francisco. Those young men who want to equip themselves as mining engineers and metallurgists can do so without cost at the University of California. Hundreds are doing this and are following the profession now. But the mere learning to assay amounts to very little and in these days does not pay, unless some other branch is combined with it.

THE profit to Chicago from its water-works for the last fiscal year was \$1,389,854.

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W. B. EWER, }
 CHAS. G. VALE, } EDITORS

Our latest forms go to press on Thursday evening.

Entered at the E. F. Postoffice as Second-Class Mail Matter.

San Francisco, May 20, 1893.

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Comment.

From the letter of a correspondent of the PRESS, published on page 309, it will be seen that Los Angeles will shortly have a smelter in operation. Ores are to be purchased by the company which will be a good thing for those owning mining properties. There are mining claims in that region which have remained undeveloped because it has cost too much to ship ores to smelting works in this city, but with such works near at hand, the mines can now be worked. A testing plant for the cyanide process is also being put up at Los Angeles, which is more than has been done in this city, though the company at Denver, owning the patents, have been asked to establish a branch here, where ores could be tested. It will now be in order for the Los Angeles capitalists to help the miners out in developing their properties, but if they keep their pockets buttoned, the miners will be helpless. It takes money to open and start mines up, and few prospectors have any. When once the mine is properly opened, if it is any good at all, it can keep itself running all right.

On another page is a well-written description of one of the big mines of Shasta county—the Texas Consolidated. Mr. Barnes, who wrote the article, is a mine-owner himself and a conservative man. It is probable he is slightly in error, however, about the amount of ore delivered by the Hallidie tramway with the buckets 160 feet apart. It is more likely they are 120 feet apart on the rope. The statement about there being very little dead-work in the mine requires modification also, as, if memory serves us, there are some 3000 or 4000 feet of bedrock tunnel—all in barren ground. In the fourth paragraph, where the "width of two chains" is spoken of, the types should have read two "claims." Mr. Hart, the owner of this mine, is a very enterprising man, and deserves his good luck in getting such property. It has paid him so well that he has also bought and opened the Cleveland Consolidated, or Bullychoop group, on the Bullychoop divide. Here a cyanide plant is to be used. There is a very large deposit of ore, and Mr. Hart expects the new property to be very profitable. If it does as well as the Texas Consolidated, he will have nothing to complain of.

An accident happened this week at the vertical shaft of the Calumet & Hecla mine, Michigan, by which ten miners were instantly killed. The engineer hoisted the cage "into the sheaves" and the men and cage were dashed downward 3000 feet. The bodies were torn to pieces and had to be carried to the surface in canvas sacks. The engineer says the indicator failed to work and he did not know that the cage was at the surface. There are so very many mechanical appliances for the prevention of this particular kind of accident, which was

formerly so common, that no big mine like the Calumet & Hecla should be without them. They should not depend on the indicator alone, as seems to have been the case in this instance. Any one of a dozen appliances would have informed the engineer or would have automatically shut off the steam as soon as the cage came above the shaft-mouth. An investigation will take place, of course, and the responsibility fixed. When there are well-known appliances to prevent such accidents and the managers fail to supply them they should suffer exemplary damages.

In the PRESS a week or so ago, mention was made of the resignation of Mr. Edward Coleman as superintendent of the Idaho mine, and the appointment of Mr. Eugene Oreller in his place. From a long practical training, no one is perhaps better fitted to fill the place than Mr. Oreller. The leaving of Grass Valley by the Coleman brothers must be a matter of great regret to all who feel interested in the welfare of the place. No individual or company has done anything approaching the good the Coleman brothers have done for that place in every way. In February, 1860, they purchased the old North Star mine, made a great success of it, sold out and commenced developing the Idaho mine, which has proved to be the richest gold mine on the Pacific Coast, having paid handsome dividends for the past 23 years. Through them, the branch railroad was made from Colfax to Grass Valley and Nevada City, and they were largely instrumental in bringing in the water supply for working the different mines. These gentlemen have been identified with industrial and mining matters in Grass Valley for a great many years, and the life they have lived has earned for them the respect of the entire community. They now have large interests in San Francisco and will probably reside here in the future.

In the MINING AND SCIENTIFIC PRESS of last week reference was made to the utilization of the magnetic-iron sands on our sea-beaches, by magnetic separators, as is being done elsewhere. Since then we learn from the Del Norte Record that a plant is being put up on the beach fronting Crescent City, with which they expect to handle 1000 tons of sand per day and obtain 100 tons of iron, to be shipped to this city for smelting. The plant referred to belongs to the Lawson-Rice syndicate, and is in charge of Mr. Arkew, who is the inventor of the process of manufacturing iron from black sand by the aid of electricity. The *modus operandi* by which the sand is operated and converted into iron is not known, but the claim is made that if the sand will yield 10 per cent iron, it can be worked profitably. The company is already getting its plant moved to the ground where operation will be commenced, and will receive by the next steamer a new engine and boiler which will be used for running the dynamo; the smaller engine will be used for pumping and running the cable for carrying sand. It expects to have the plant in working operation before the first of June, and when running will employ about 30 men. In the employ of the company are Messrs. Henry and Paul Raymond, who were at Crescent City several years ago, running a gold-saving machine on the beach. The company has already in operation in Oregon a plant for the reduction of ores by electricity, and should this one at Crescent City come up to the expectations of the inventor, the company will no doubt put up a larger plant.

The appointment of John Daggett, owner of the famous Black Bear mine, Siskiyou county, as superintendent of the U. S. Branch Mint in this city is a victory for the miners of California, all of whom, regardless of political affiliations, united in an effort on his behalf. While Mr. Daggett has played an important part in the development of the mining interests of the northern section of the State, his efforts have not been confined entirely to that district. For a number of years he has been a part owner in the Calico mines in southern California and has greatly aided in developing them. He is also interested in land transactions throughout the State. Mr. Daggett has always been more or less in politics. In 1859 and 1860 he served the State as a legislator. He was chosen to represent the district composed of Del Norte and Humboldt counties. In 1882 Mr. Daggett received the Democratic nomination for Lieutenant Governor of the State and was placed upon the same ticket with Governor George Stoneman. Upon the expiration of Mr. Daggett's term as Lieutenant-Governor, he deserted the political arena and devoted his energies to the development of his private interests until 1891, when he was appointed a World's Fair Director. It is the duty of the superintendent of the Mint in this city to collect annually the statistics of production of precious metals on this coast and to prepare the descriptive chapters setting forth the condition of the gold and silver mining industry. Until now we have never had a mint superintendent who took any special

interest in this branch of his duties or knew much about it. Mr. Daggett, however, from his long experience in mining, will doubtless prepare reports which will be of service to the mining community.

Of chief interest among the events of the week is the affirmation by the United States Supreme Court of the Geary act, relating to Chinese residents of this country. By this decision it is held that it is perfectly competent for the legislative branch of the government to compel the registration of any class of aliens and to prescribe the penalty of deportation for the refusal or neglect to comply with the law. It will be remembered that this act was passed by Congress a year ago and that one year was given for the Chinese to comply with it. All who have not complied with it (and they number nineteen-twentieths of all the Chinese in the country) are now liable under the law to arrest and deportation.

On the basis of this decision, it has been hastily assumed by anti-Chinese enthusiasts that within a few weeks all the Chinamen in California will be bundled back to their own country, but this is the wildest sort of folly. It is, in fact, a thing physically impossible. The Chinese failed to comply with the law under the theory that it was not constitutional. Now that it is demonstrated to be constitutional, they will no doubt comply with it. Congress will, of course, extend the time for registration.

It is estimated that there are 80,000 Chinamen subject to arrest and deportation under the law, but it provided that in each case the delinquent must be brought before a United States Court, that his delinquency must be proved and that judgment of deportation must be rendered against him personally. If our courts were to devote their whole time to cases of this kind they could not dispatch one thousand per month. Furthermore, it is estimated that to send 80,000 persons to China would cost at least six millions of dollars, whereas there is available for carrying into effect the Geary law less than sixteen thousand dollars. Clearly the job is out of proportion to the means. Nothing can be done until Congress meets, and then no doubt time will be provided to enable the Chinese to comply with the law. In fact, the purpose of the Geary law was not to send away the Chinese now here, but to provide a means for detecting or identifying Chinese unlawfully present in this country. A little patience will accomplish all this.

Edward O. Leech, Director of the Mint, has resigned to become cashier of the National Union Bank of New York, to be opened June 1st. Doubtless Mr. Leech will make a better bank cashier than Mint Director. This gentleman was always held up in Washington as an example of the failure of the plan of promoting a subordinate to chief of a division. He always used to speak of "my mint," "my report," etc. Originally brought into the Mint Department because he was a good baseball player and because he was wanted in a mine, he kept there, and has been for some years chief of the Mint Bureau. In his annual reports he never specified the difference between his own estimates of gold and silver production and the exact returns gathered by the statisticians of his department. The result is that one will find on one page the total production of a State and a few pages further on an entirely different total—the latter being usually the Mint Director's "guess." There is nothing said about one set of figures being actual returns and the other an estimate. The attention of Mr. Leech has been called to these discrepancies but as he supposed all knowledge of such things was confined to himself he has continued the practice. Another practice established and continued by Mr. Leech is that of sending out circulars asking for returns of bullion product of mines and stating that the information furnished will be considered confidential and only used in making up the totals of the States. Yet when the report appears the name of every mine appears with its respective figures of production. This habit has also been called to Mr. Leech's attention, yet he continued it. However, many mine-owners now decline to furnish the information, so Mr. Leech has more scope for his guesses, as he calls the estimates which appear in his report. It is to be hoped that this gentleman's successor will at least keep faith with those furnishing him information, and, if he promises to keep confidential these figures, will not publish them. If the new man does this he will be apt to get out a much more accurate and reliable report of the bullion production of the country than Mr. Leech has been able to do.

THOMAS MEIN, the California miner, who is superintending the Robinson gold mines in South Africa, has reason to feel proud. The company, at its last meeting, voted him a present of \$2500 besides his annual salary. The company evidently knows a competent man when it sees him.

Mineral Exhibits at Fairs.

In the matter of making displays at exhibitions and fairs, more seems to depend upon the efforts of the individuals managing it, than upon the amount of money they have to spend. A few energetic, active men will accomplish greater results, with a small amount of money, than a large "show" committee with ample funds. At the time of the Paris Exposition in 1878, at a meeting of citizens a commission was appointed to collect and display an exhibit to represent the mining industry. An executive committee was appointed in this city, consisting of Almarin B. Paul, Henry G. Hanks, J. P. Jackson, Melville Attwood, A. Deere, Dr. E. J. Fraser and Sol. Heydenfeldt, Jr. The legislature refused to give any money whatever, and as those gentlemen had been collecting many specimens they were at a loss what to do. Mr. John W. Mackay, who was in Virginia City at the time, reading of the matter in the papers, sent Mr. Attwood a check for \$5,500 to be devoted to the mineral display, asking also, that his name should not be mentioned. With this money they went to work and made a few collections, and Mr. H. G. Hanks was sent with it to Paris. None of the committee received any salaries, and only one of them, Mr. Hanks, went to Paris, his expenses being paid. The exhibit made attracted much attention and a medal was awarded it.

Here was a case where a few active, intelligent men accomplished good results. In the matter of our State mineral exhibit at Chicago, the Commission set aside \$15,000, but, judging from the reports of Chicago correspondents, it is by no means what it should have been. The letters of the correspondents have, however, had a good effect, for many more specimens have since been sent on by express, showing that the original collection was deficient, as charged. Most of that lately sent relates to the gold-mining industry, the leading one of this State.

The delay in the preparation of the building and the exhibit has been injurious to the interests of California, and the people here are indignant that it should have occurred, after having provided, long in advance, abundant means. The trouble has been, apparently, that there has been more consideration as to who should receive salaries than as to who was capable of doing the work. The mineral exhibit has come in for some sharp criticism, but this has done good, for, as stated, many additional specimens have recently been forwarded.

TWO MILES above Lake City, on Perry creek, which empties into the North Fork of New river, Trinity county, Steve Noble and his sons have been mining all winter by ground sluicing. The gold they obtain is all coarse, the pieces ranging from one to thirty dollars, the latter being the value of the largest piece found by them the present season. That it is paying well is evidenced by the fact that they in one day have taken out as high as \$75 in nuggets during the winter's run.

THE shaft in the McCarthy cinnabar mine has been sunk to the depth of 33 feet, and the superintendent of the works, Captain Hook, started a crosscut to run 35 feet northwesterly. It is anticipated that this will be a sufficient boring to determine whether it will be profitable to continue the mine as an ore-producing proposition or to abandon it and convert it into ordinary suburban real estate. It will probably be suburban real estate.

THE revised plans and specifications for the new union ferry depot make the building 150 feet wide by 666 feet long. Ninety feet was taken off each end of the original plans for the time being. Chief Engineer Holmes claims that \$25,000 in cement has been saved the State by the delay in letting the contract. Experiments were made which proved that the original foundation plans for concrete were heavier than really needed.

THE appraisers of the estate of the late Henry Martin, of Deadwood, Trinity Co., have placed its value at \$220,320. They value the one-third interest in the Brown Bear mine at \$40,000, but most miners will think it worth more than that. Mr. Martin, among other things, had \$63,210 cash on hand. He made all his money out of the Brown Bear mine.

MESSERS, FRASER & CHALMERS, the Chicago mining-machinery manufacturers, have an exhibit at the World's Fair occupying 6060 feet in the southeast corner of the Mines and Mining building. They also have a triple-expansion 1000-horse power Corliss engine in Machinery hall.

THE interest in the mines of the Colorado is increasing daily and much gold is being taken out. The steamer Gila has left Yuma with 156 carloads of pipe and other freight for the Picacho placers. It is proposed to put in a pipe line from the Colorado river, to furnish water for washing the dirt.

The Brown-Allen O'Harra Roasting Furnace.

The furnace illustrated on page 305 is an improved form of the O'Harra furnace, which has been in use for some years. The improvements consist essentially in the perfection of mechanical details, and in the protection of the working mechanism from heat and fumes.

As originally constructed, the O'Harra furnace consisted of a double hearth reverberatory with extensions on either end for carrying shafting and pulleys. Round these pulleys a chain was passed, forming an endless belt to which stirrers were attached. These stirrers, which consisted of triangular frames having suitable blades or points, rested directly on the hearth of the furnace. Motion was communicated to the chains by suitable power, and the stirrers were by this means dragged through the furnace. The driving chain passed through the center of hearth where the heat was most intense and was consequently subjected to so great a heat as to soften it, and cause it frequently to part in the weld. It was also exposed to great wear by attrition from running over hot pulp. The stirrers resting on the brick hearth rapidly cut it away and wore themselves out, causing great friction and strain upon the chain, which was injured by the heat and wear.

This combination of disadvantages neutralized the otherwise excellent working of the furnace.

The first improvement made on the furnace was by placing cast iron tracks through the hearth and mounting the stirrers on wheels. This revolutionized the desulphurizing of ores by mechanical stirring, as the friction was so much less that an increased number of stirrers could be used, thereby increasing the duty of the furnace, and the wear was so much less that the stoppages were reduced so that the furnace could be kept at work a much larger period of the entire time.

By additional improvements the construction of the furnace has been so modified as to place all of the tracks and moving mechanism outside of a slotted wall or partition, thereby protecting them completely from the injurious effects of the heat and fumes. Supported by the wheeled carriers and projecting through the slotted wall of the partition, is an arm carrying the stirrer blades. This arm is rigidly supported by the weight of the wheeled carriers, so that the stirrer blades do not touch the bottom of the hearth. This construction reduces the friction to a minimum and obviates all the troubles from excess of heat heretofore experienced in stirring mechanically. The duty of the furnace has been increased from 15 tons per day to an average of about 40 tons, without increasing its size. The general features of construction will be readily understood by reference to the cut, which exhibits an elevation of the furnace with the side walls broken away to show the passages for the heat and gases, and the general arrangement of the fire boxes for the two hearths. The distinctive feature of the furnace, as regards protection of the moving mechanism by the slotted wall in partition, is plainly shown in the cross section.

It has long been considered that the reverberatory form of furnace was the best known means for desulphurizing or chloridizing ores, the only drawback to such furnaces being the expense of hand stirring. By the improvements which have been made and are now incorporated in the O'Harra furnace, this objection is entirely obviated and it has become one of the most reliable and effective furnaces in use. There are now 22 of this class of furnace in use, giving the most perfect satisfaction as regards the amount and quality of work being done. As compared with hand-roasting, the cost of roasting on the improved O'Harra is about one-fourth, with a corresponding saving in the amount of fuel per ton and in losses by dust and volatilization. In the improved O'Harra the heat is so evenly distributed that no portions of the ores get overheated, so that the operation of burning off the sulphur and final breaking up of the sulphates can be carried on with a minimum heat, and consequently a minimum loss from volatilization. Experience has demonstrated that this distribution of heat is a great advantage, and also, that the action of the furnace is so gentle and regular that no dust is raised in stirring, which is a very important feature. In practice the entire charge is stirred about twice each minute, so that as compared with hand-roasting, the stirring is constant, and in point of time and efficiency the results approximate very closely to muffle roasting. The furnace admits of being so modified as to be thoroughly adapted to the nature of the work to be done.

By referring to the cut, the operation of the furnace will be understood as follows:

The ore is dumped into a hopper from a car, as shown, and is fed automatically into the furnace, the amount fed being regulated by weight, as may be desired. The ore is gradually drawn through the furnace by the action of the stirrers on the upper hearth, to an opening close to the rear end, where it drops down to the lower hearth. The stirrers pass out through a suitable doorway and in travel-

ing the length of the extension floor, out and back, become so far cooled as to neutralize the effects of any heat which has been absorbed during the passage through the furnace. In passing through the lower hearth, the stirrers again take up the ore and gradually work it forward until it is discharged. There are six stirrers on each side, the two sides working independently, and the stirring operation is carried on at the rate of two operations each minute, so that every portion of the ore is exposed to the action of the heat and oxygen, almost continuously, resulting in a very perfect and rapid roasting of the material. The arrangement is such that the ore travels against the heat and gradually works towards the hottest end of the furnace, which is the rational proceeding in desulphurizing ores, as when the sulphur is nearly all eliminated the heat must be increased to keep up the operation. From the fact that the working mechanism is protected, and the stirrers are so much of the time in the open air at the two ends of the furnace, no amount of heat can be generated in the furnace that will have a destructive effect upon the machinery, and the charge being stirred so continually, the most fusible metals do not have any tendency to ball or form accretions on the hearth as is the case with hand stirring in which the charges are only moved occasionally.

This furnace is particularly adapted for chloridizing silver ores, and, in fact, was originally designed for this purpose only. Where there is but little sulphur in the ore to be chloridized the salt and ores are fed together and worked through the furnace, but where there is considerable sulphur that needs to be burnt off before the salt is fed, the desulphurizing process is done on the upper hearth and the salt is fed to the ores on the lower hearth. The makers of the furnace, Messrs. Fraser & Chalmers, of Chicago, have also an automatic feeder for feeding salt, which can be built into the furnace at any desired point over the lower hearth, so that the salt can be admitted as desired. Owing to the constant stirring and thorough exposure to the heat, a much better chlorination is obtained than by the usual practice, and with a minimum amount of salt.

From 50 to 60 tons per day can be chloridized in one of these furnaces at an expense for fuel and labor of about 50 cents per ton. Another important feature in chloridizing ores which of necessity are crushed fine, is the small amount of dust that is raised. The action of the stirrer is so uniform and gentle that no dust is raised by the stirring, and the only point where dust is formed is where the ores fall from the upper hearth to the lower hearth. From the passage between the upper and lower hearth to the flue entering the stack, the distance is so great that nearly all of the dust settles before reaching that point.

One of these furnaces was put in where revolving cylinders had been used, and the amount of dust collected upon cleaning up the dust chamber was just one-tenth of what had been previously collected from the cylinders in the same length of time. The arch of this improved furnace is so high above the ore bin that the draft following the roof is not strong enough to create any dust, so that no dust is formed except as above noted.

There is no duty which can be required of any furnace in the way of roasting or chloridizing any class of ore to which this furnace cannot be adapted, except in cases where it is required to actually sinter the ore together. Where sintering is required an auxiliary hearth is constructed, into which the calcined ores are discharged by the machinery, and the work on the sintering hearth is done by hand.

Foundry Notes.

The Risdon Iron Works report business brisk in Heine patent safety water-tube boilers and Bryan quartz mills. They are also making a good many sales of the Hawley smoke-consuming furnace. Several have been put in new boiler plants in this city, and the results justify their use both in economy and prevention of smoke. One of these appliances is in use in connection with the boilers at the Risdon Works, and, although a very common grade of coal is used, there seems to be a perfect combustion, as no smoke comes from the stack.

These works provided for the Alameda Electric Railroad, which has just started up, 250-horse power compound tandem Ball engines, Conover condensers and Davidson pump. They have recently commenced the manufacture of the Johnson ore concentrator, and six of these machines are in course of construction in the shop, to be sent to mines in different parts of California. We shall give a detailed description of the new concentrator in the PRESS of next week.

Like most of the foundries in this city, the Risdon has more or less machinery, etc., on the sidewalk around the works. This is now being cleaned up, painted and utilized for advertising by having the name of the article painted thereon.

Coast Industrial Notes.

UPON report of the State Prison Commission's engineer, W. R. Eckart, the machinery in the new jute mill has been accepted and the contractor's bill for \$38,442 ordered paid.

THE directors of the San Antonio Water Company have voted to call an election of the stockholders to vote bonds for \$500,000 for the purpose of purchasing additional water to double the present supply of Ontario.

THE right of way for the Southern Pacific railway into Riverside has been fully secured and construction will probably be begun soon. The new line will run from Colton, via Riverside, Pomona and Monrovia, to Los Angeles.

IN the boilers of the stern-wheel steamer Frank Silva are completed on time the new Whitney Express between this city and Oakland will be in operation by Monday next. It is generally believed that the opening of this ferry will be the signal for a general cut.

IT is reported that the Southern Pacific will begin the construction of the Black Canyon line, surveyed over a year ago, to connect the Maricopa and Phoenix line with the Bullock road, a distance of 110 miles, from Phoenix to Prescott. Recent estimates show that three-fourths of the freight and passengers coming into Phoenix now pass over the Santa Fe line to Deming, most of which will come from the north when the new line is completed.

REPRESENTATIVE CAMINETTI is trying, before going back to California, to induce the members of the House Committee on Rivers and Harbors to go with the Senate sub-committee to the Pacific coast to select a proper site for the proposed deep-water harbor in the vicinity of Los Angeles. By having both houses of Congress represented in the party making the trip, the chances would be better for legislation next session favorable to California rivers and harbors.

AT last Oakland and Alameda are joined by an electric road, for the Oakland, Alameda and Piedmont Railroad Company is now in regular operation. The line runs from Broadway and Seventh streets in Oakland, down Broadway to First, then across the Alameda marsh by way of Webster street to Santa Clara avenue in Alameda, and up that thoroughfare to Park street; thence along the latter street to the Twenty-third Avenue Station of the broad-gauge train in East Oakland. The electric service is a great improvement over the days when it took nearly an hour to go to Park street in the old horse-cars—those antiquities of a past age. The cars are making regular and profitable trips.

NEARLY 200 retail merchants of the Willamette Valley, Oregon, are expected to arrive in this city on May 27th. The object of their visit is to ascertain what inducements San Francisco can offer to secure the trade of that part of the country. Prior to the adoption of the high tariff of the Southern Pacific the bulk of the buying in Oregon was done here, and hundreds of thousands of dollars were spent annually in California. The Oregon Pacific and the Willamette Valley and Coast Railroads have recently changed hands, the result being a decided cut in rates from this city. The merchants, realizing the advantage of purchasing in California, decided to lay the matter before the Board of Trade of this city.

THE work of driving piles for the ferry pier of the California and Nevada Road at Emeryville will commence soon, a new engine for the driver having been completed. President Emery says that it was expected to complete the construction of the pier and the throwing of the road from a narrow to a broad gauge in about eight months. The contracts for all the material and for the new rolling stock have been let. The pier is to run parallel with that of the Southern Pacific at Oakland, and will be in direct line with Goat Island. When the pier shall have reached a point where the water is of sufficient depth to permit, a boat will probably be chartered to serve as a temporary ferry until the two large and speedy boats shall have been built.

THE Secretary of the Painters' Union at Los Angeles writes to the *Examiner* as follows: "There have appeared advertisements in the San Francisco papers for laborers and mechanics for this city. The local press, real estate agents and contractors are endeavoring to create the impression that there is a boom in Los Angeles and that there is a scarcity of mechanics in the building trades. Such is not the case, as any well-informed mechanic will tell you; it has been the dulllest winter for several years. There have been and are at present hundreds of idle men, especially among the painters, of whose condition I am better informed. They have not, and are not now working more than half the time, and they are still coming in from all parts of the country."

THE Harbor Commissioners at their meeting Tuesday afternoon opened bids for the construction of the foundation of the new ferry buildings at the foot of Market street. The plans and specifications were lately revised. The contract was awarded to the San Francisco Bridge Company for \$247,837, it being the lowest bid. Bateman Brothers, whose bid of \$328,500 on the original plans was refused, filed a protest against the award of the contract. There were eight bids presented to the board as follows: Bigelow & Fogg, \$346,000; California Bridge Company, \$337,767; Doe, Hunt & Co., \$297,000; McCann, McKay & Phillips, \$290,000; McMahon & Son, \$295,000; Catton Brothers, \$317,227; and Healy, Tibbets & Co., \$309,000. The San Francisco Bridge Company's bid was over \$40,000 under that of McCann & Co., who were next to the lowest bidders. The bonds required amount to \$130,000 and will be filed this week. "We are glad to have the contract let," said Commissioner Cole, "and hope to see the work on the foundation progressing within the next ninety days. Until ferry slips 3 and 4 are completed by the McMahons, the present contractors, very little can be done on the work just yet."

Something About Placer Values.

IT is an undeniable fact that the hunt for gold properties for the past few years has not kept pace with that for silver. Now that silver-lead has a "black eye," the inquiry for gold becomes greater and already the festive prospector announces while seeking for some one to grub stake him, "that he is going to look for gold, be it placer or quartz." Throughout the mountain ranges within easy range of this city are thousands of acres of gold-bearing placer which could be made productive if worked to the best advantage and by the best methods. There may be a recurrence of discoveries such as Alder gulch, Last Chance and Boise basin, but we do not deem it probable; those picnics have had their day, and the man who reports that he has discovered placer that prospects twenty-five cents to the pan from grass roots may safely be set down as a mining camp liar, whereas if the statement made would call it one cent to the pan for an average it would be under proper conditions of working a good thing.

IN support of this we will figure up what that prospect would amount to for a cubic yard. Allow three pans of dirt to the cubic foot and you have eighty-one pans or that many cents to the cubic yard. Admitting that conditions are favorable for working and a claim using one pipe head of water will employ seven men for twenty-four hours, making the cost of running the claim about twenty-five dollars per day; this will count wages, wear, tear and repair of tools. These men ought to have deposited in the box each day gold dust valued at the lowest calculations \$175, or a profit of \$150, by hydraulic methods. Beginning work on April 15th and ending November 1st there should be, less stoppages for various purposes, 190 days of actual placer mining in our northern country, which would give a profit of \$28,500. The placer miner who reads this will exclaim at once, "there are not a dozen placer claims in the whole country that pay this figure." Why not? Because this estimate is made on the hypothesis that the ground is already open with an abundance of water and dump, ditches and reservoirs made, pipe, giant and flume all in place and everything in working order, and that the ground actually gives an average prospect of one cent per pan from the grass roots to bed rock, and that the miner picks down three times as much dirt as he would pick and shovel into the boxes. Even give an average of one-half a cent per pan on this basis and the income is a good healthy one and would be very gratifying to the majority of placer workers.

This estimate is made to show the folly of listening to men who come in with stories about having ground that prospects twenty-five cents to the pan where water and dump are convenient. The writer has seen \$11 panned out on the point of a shovel, and as high as \$110 to the pan on the bed rock, yet the claim only averaged three cents to the pan from the grass roots to the bed rock, and it was considered very rich ground by old-time miners, and it was; it paid enormous profits working it old style with a pick and shovel, mud boxes and sluices with slight head of water, and wages five dollars per day.

NO better investment exists at the present than to work placer grounds under favorable conditions of water and dump that will average one-half a cent to the pan, from surface to bed rock, where there is large enough body of ground to insure steady work during the placer season for a term of years. There is no question that there are large areas of ground in the Northwest that will pay handsome returns on the capital invested to open the ground that will not average one-half cent to the pan; but do not be misled by exaggerated statements of ten to twenty-five cents per pan into making foolish investments; such ground only exists in the imagination of the mining sharp looking for suckers.

THERE is no better time than the coming season to look for and secure tracts of placer territory, which, if properly opened and worked, will give an assured and comfortable income for years to come. Then the nation needs gold which, thanks to our able-bodied law makers, is the only money we have, and who obey the behests of Wall street in preference to the will of the people.—O. C. in Northwest Mining Review.

BUTTE COUNTY MINES.—The mining resources of this county are scarcely known. The clays, iron, copper and other minerals besides gold are entirely undeveloped. Near Wyandotte, twenty years ago, there was a great mining excitement over copper and a number of ledges were discovered. When the country is more populous and the railroad facilities better, these ledges will be worked. There are half a dozen places in the county where rich and extensive beds of iron ore are found. There is no finer marble in the United States than can be found in Butte. Silver is not wanting, and so with a number of other metals. The royal metal, king gold, is being found in ledges now more extensively than ever before known in the county, mills are going up in every section, and there is an activity and a bonum that promises to put more life and vim into Butte than we have witnessed these thirty years. Our mining resources are immense and are as yet practically undeveloped.—Oroville Register.

CALIFORNIA STATE MINERS' ASSOCIATION.—The miners of California should bear in mind that it is only thorough organized effort that any good results can be accomplished. They now, for the first time in the history of California, have a thoroughly equipped organization, officered by able and trustworthy men. The State Miners' Association has accomplished much and can accomplish much more if the proper support be given it by the residents of the mining counties. True, the association has been deceived and betrayed in some instances where the association had a right to expect better treatment, but the association itself has always been on the right road and has done much toward moulding public opinion and preparing for legal victories. The Anti-Debris Association, with which the miners have to contend, has a thorough and complete organization with a full complement of paid officers, agents

and attorneys. The Anti-Debris Association has an income from the various counties through which it extends of over \$2000 a month. It has a salaried manager, a paid attorney and numerous paid agents or spies. To meet the work of this organization the miners must support their own association. So far, the miners have contributed but lightly to the funds of the association, while the greater portion of the moneys heretofore raised by the association has been voluntary contributions by the business houses of San Francisco. The miners must show their appreciation of the help received or they will lose the friendship and support of their natural allies in the commercial world. The miners are now passing through a critical period and must be thoroughly united to secure ultimate victory. Stand by your State Association—miners of California.—Mountain Messenger (Sierra county.)

River Bed Mining.

A somewhat curious experiment in river mining is now being made with flattering success in Shasta county. For a distance of nine or ten miles up-stream from Redding the Sacramento river-bed is rich in gravel gold. In early days this district, embracing both sides of the river, was one of the richest diggings in California. All of the creeks and water channels putting into the river thereabout carry more or less gold and during the placer mining era when the beds of these water courses were raked over and over for treasure, the river finally received the gold, which the miners disturbed but failed to get. By means of wing-dams and other devices the river-bed itself has yielded many thousands of dollars in dust, but there are places and spots that could not be wing-dammed, which are rich with the spoils of centuries of wash.

J. W. Brackett, a former resident of Shasta county, states that the Diestlehorst brothers, who own a farm on the river bank, close to Redding, have rigged up a crude dredger with which to work the rich spots in the river. The boat is decked over and carries an engine which is utilized for several purposes the chief of which are to operate the dredging apparatus and to move the boat. When it is necessary to proceed further up-stream, a line is carried up the river several hundred yards and made fast, and a steam windlass does the rest. The greatest drawback to the enterprise is the comparatively small amount of gravel that may be raised with the crude means at hand.

However, in some spots as high as \$20 per day has been averaged for a week at a stretch. In many places where the prospects are most flattering, the formation of the river bed renders impossible the lifting of gravel in paying quantities. Little, if any, difficulty would be experienced with a dredger such as is used in the bay. The running expenses of the enterprise are nothing at all, the fuel for the engine being driftwood picked up along the beaches. So, if two men average from \$10 to \$20 per day, they consider themselves making big wages, with the possibility always in view of "striking it rich."

The Diestlehorst brothers began operations last fall, and the success they met with so encouraged them that one of the brothers came to San Francisco and bought a new engine and some necessary machinery with which to better prosecute the work this season. During the high water of the past winter the boat broke loose from its moorings and was carried several miles down stream, and it is now wisely proposed to prospect the river bed all the way back. It is possible that some wonderfully rich spots may be encountered, and if such happens to be the case it is probable that next year will witness the interesting spectacle of a fleet of gravel dredgers on the upper Sacramento.

IN one spot, about three-quarters of a mile east of Redding, a couple of negroes averaged from \$18 to \$20 per week all of last summer scooping for gold. They would wade out waist deep in the water, sink a bucket, and taking a long breath, settle under the water and fill the bucket with gravel. This was hard work and unhealthful, but it paid better than whitewashing or yard-cleaning in town. The negroes paid \$2 a month each for the privilege.—Bulletin.

Mineral Wealth of Amador County.

THERE is no questioning the fact that a new era of prosperity is about to dawn upon the mining industry of California. Amador county, situated as it is, on the very heart of the mother lode, ought to reap considerable benefit from the impetus that will to a certainty be given to the business of mining in the near future. There are miles upon miles of the mother lode within Amador's borders that have never been touched. Besides this there are immense deposits of ore on both sides—east and west—of the mother lode and running nearly parallel that where opened up and prospected, have proven fully as rich in the precious metal as the original vein, and there are cross ledges without number with good surface indications that the pick of the miner has never penetrated. It seems as though some "hoodoo" had taken possession of the mining energy of the people except in a few limited localities. The gravel deposits in the county cover nearly two-thirds of its entire area, and competent judges believe that if properly prospected and worked no richer mines of this character could be shown in the State. For more than 20 years past this branch of the mining industry has been almost utterly neglected; in fact from the start it seems never to have assumed any great importance in the mineral output of this county. The quartz interest has always seemed to overshadow every other mining enterprise. The *Record* is inclined to believe that one cause of the indifference of her people to Amador county's great mineral wealth lies in the fact that the most of them are farmers and stock raisers, owning their own land, and who, as a class, know nothing, and care less, about the millions of treasure that lie hidden under the surface of their broad acres, only waiting for the brawn and muscle of the hardy prospector to penetrate the mysterious depths that lie beneath the upper crust of hill and canyon and lay bare this golden storehouse of natural wealth ready at hand to enrich our people.—Amador Record.

Testing Ores for Working Processes.

TO THE EDITOR:—There is a general and justifiable distrust of experiments on a very small scale designed to test the efficiency of any given process, old or new, for the treatment of ores, and we often hear such a remark as, "Oh, it's all very well in the laboratory, but the question is, will it work in practice?" I say this feeling is justified, because it is historical that many failures have resulted from placing dependence on laboratory tests of processes which failed to yield similar results on a working scale.

Many years ago I heard of a wonderful smelting process by which pure silver was obtained in a single operation from an ore containing from 20 to 30 per cent of copper, a large proportion of lead, and a considerable quantity of antimony. I rode 100 miles on horseback, mainly to see this marvel, and it was a fact! The process was secret (?); but I was admitted to the works, saw the product, touched my tongue with a piece of the slag, *not, however, until it was cold*, and, presto! the secret existed no longer for me. The ore was smelted in a reverberatory furnace, and the, or a chief, flux was *nitre*. The enthusiastic inventor, who, by the way, was a *doctor*, was quite honest in the matter; he spent several thousand dollars of his own money, as well as other people's, on the venture, and he did what he said he would, in one sense, but it did not *pay*. If the worthy doctor had counted the cost, and the difficulty of doing continuously in a reverberatory furnace that which worked so nicely in a French crucible once or twice used, he would have known that it would not pay.

This is not the only instance in which the fascinating properties of nitre have captivated the fancy of would-be inventors. One gentleman, a metallurgist (?) this time, had the *scintillating* idea of using nitre to effect the rapid oxidation of auriferous sulphurets in the furnace. While he was experimenting, with great effusion and some success, a waggish friend suggested adding *sawdust* to the mixture; the next report was, "G—d—m it, it all went up the chimney." This result was not surprising to those who happened to know the composition of *gun powder*.

A recent instance of the failure of a metallurgical enterprise, based on laboratory experiments, was that of a young man who wished to work tailings by the cyanide process. Taking a pound of the material and shaking it in a bottle with cyanide solution, he found that the gold dissolved to a very high percentage. He then put up some vats and attempted to treat the tailings by percolation without agitation; the result was, that although the gold dissolved he could not get the solution out of the mud, even by the aid of a pump. Again, a gentleman undertook to test some silver ore by pan process, on a laboratory scale, in a common iron mortar. The same ore was being worked in a mill with fair results, being ground in the pans with bluestone and salt for several hours before adding quicksilver. The gentleman wished to imitate the mill operation exactly and, not being a practical metallurgist, thought he did so by taking a couple of ounces of the ore, grinding it for *two hours* with a similar proportion of salt and bluestone to that used in the mill, in a clean iron mortar, then adding quicksilver, and working without grinding for several hours more. The result was, not a trace of silver recovered.

I have found that ore which could not be successfully roasted in a Bruckner furnace, on account of haling, could be roasted well and easily in a roasting dish in the muffle. Iron pyrites can be perfectly roasted in the course of a few minutes before the blowpipe, yet an ordinary furnace requires from twelve to twenty-four hours to effect a similar result. The electrolytical decomposition of ores and recovery of their metals has been successfully accomplished many times on a small scale, and has failed many times when tried as a practical working process.

Instances might be multiplied almost *ad infinitum*, and this constitutes the justification of the prejudice against small tests in the minds of practical men of business, many of whom, nevertheless, continue to be led astray by the dreams of impractical experimenters, to say nothing of the schemes of rascally charlatans who know only too well that their projects must result in disaster to all concerned, themselves alone excepted, and who, together with the ignorant, self-lauding, "practical man, sir," make capital of the failures of honest, perhaps also scientific, enthusiasts who are lead away by *truths* which, however, must be co-ordinated with other truths in order to be applied successfully to practical purposes.

In order that a small test may be absolutely reliable as to results on the large scale, it is indispensable that all *essential* conditions shall be such as can be absolutely the same in the large as in the small operation. This applies to mechanical as well as to chemical and other conditions, not omitting the pecuniary feature, for metallurgy is an economic art, and it matters not how well a process may perform its function, if results cost more than they come to, or if a less perfect process yields larger profits without wasting the mine, the perfect process is of no practical use. I say without wasting the mine because it is notorious that valuable mines have been wasted to a great extent by the adoption of inferior methods in treating the ores, simply because those methods yielded larger immediate profits to the individual owners, a system which may suit them, as they cannot live forever, but should be discouraged by the State which will live when the greedy squanderers of *her* treasures shall be dead and forgotten.

But it is not always, I may say with reference to metallurgy not often, possible to make a very small experiment in which even *essential* conditions shall be precisely such as must necessarily obtain in the large way. Chemical reactions, *per se*, work alike in the large and in the small ways, and in the same time. I know this will be disputed, but I think the facts on which objections may be based are due to differences, sometimes unavoidable, in physical conditions such as contact of surfaces, pressure, exposure to air, conduction of heat, etc.; but I think that, for our present purpose at least, the statement may be admitted. If a pound of beans can be cooked by boiling for three hours, a hun-

dred pounds can be cooked in the same way in the same three hours; but when we come to the question of heating the water in the pot to boiling, we shall find a difference in the time required, unless we have equal proportional heating surfaces, and a pot of the same material and thickness. This illustrates, in part, what I mean by equality of essential conditions. But we shall also find that the consumption of fuel will be less in proportion for the larger quantity than for the smaller, unless we assume that the hundred pounds shall be cooked in as many separate pots over an equal number of separate fires, which would be simply multiplying our operation instead of enlarging it. And this is a point which must be considered in metallurgical tests, or, perhaps I should say, it need not be considered, because it is impossible to work on a small scale, where artificial heat is required, with as much economy of heat as on the large scale, while, on the other hand, we can attain our results, in that respect, more quickly in the first than in the last case.

The reason why a charge of pyrites in a furnace requires many hours to roast it, while a grain or two of the same ore requires but a few minutes before the blowpipe is, primarily, a mechanical one; the relatively deep bed of ore in the furnace is less exposed to the action of heated air. A chemical difference supervenes, because the effects of heat without exposure to air are different, and a large part of the ore in the furnace is excluded from air at any given moment. A similar explanation may be given of the fact that an ore which can be well roasted in the muffle, or in a reverberatory furnace, may ball in a Bruckner cylinder. The action of the Stetefeldt furnace illustrates this matter, and, for such ores as can be roasted by the brief exposure possible in it, is a most excellent device. But Stetefeldt roasting cannot be done on a very small scale; it can be approximately imitated in the muffle by "instantaneous roasting," so called; yet the chemical conditions of muffle roasting differ from those in any other furnace, and I think small roastings can never afford a perfect criterion of results in the large way.

Concentration, with or without previous sizing, can be done by hand as well perhaps as, hardly better than, by machinery; but the condition of the ore powder, as produced by various crushing appliances, is an important factor which must be carefully attended to.

Leaching and lixiviation, as often done in the laboratory, give imperfect indications of what may be done in the mill, especially as to rate of filtration and time required, but also as to results depending on washing and draining. This work should be done better than it usually is when the customer's object is to know what to do and how to do it. *The nature of the filter, the condition of the ore, and the depth of the column should be the same as they will be in the mill; the area is of little or no importance. The effect of "suction" should be observed as to its effect in accelerating the work, and especially as to extracting a higher percentage of the metal by the more perfect washing and draining, also as to the reduction in quantity of washings.* In tests of the cyanide process, attention should be given to the consumption of cyanide, and the means, manner and cost of reducing it if excessive; this may involve some analytical work, but customers should not grudge the cost; it is better to spend a few hundreds in the laboratory than thousands in the mill for information.

Chlorination in vats can be represented very well in the laboratory, that is as to results, not as to consumption of chemicals which will be much greater, proportionally, than in actual work; of course the condition of the ore must be the same in each. Operations which are performed in revolving barrels, such as chlorination, amalgamation, and agitation with cyanide solution, can be imitated or tested very well in bottles, both as to time, consumption of material and results; but, in recommending machinery, regard must be paid to the nature of the liquids, etc., as to their action on the material of the barrels. Iron or wood may be used for the cyanide process, but iron would not do at all for chlorination, that is, on the inside of the vessel.

Pan amalgamation cannot be perfectly imitated in the laboratory. The idea that an iron mortar and pestle form the *simulacrum* of a modern amalgamating pan is an error. If the pulp is not deep in the mortar, the grinding action is excessive; if a larger quantity be used, the mixing and agitation is imperfect. The mortar is especially defective for testing silver ores by the so-called Washoe process in which bluestone and salt must be used, because the iron surface in contact with the pulp is much larger in proportion to the mass of pulp than in the mill, hence the cupric chloride is decomposed much sooner. In this regard, as in many others in metallurgy, a knowledge of the mathematical law of proportional surface and mass is useful. Moreover, a clean mortar is generally used, and the mercury is usually reserved for some time. Even when the mercury is added at once with the ore, the result is not the same as that in a pan which, from previous use, is coated with amalgam. The best that can be done is to prepare the mortar in advance by putting into it some solution of bluestone and some quicksilver and causing the iron surface of the mortar and pestle to become coated with quicksilver as far up as the pulp will extend, the liquid being then removed and the ore added, also quicksilver and the desired quantity of water, bluestone and salt. The whole should be warmed and the pulp stirred, but not ground; it should be already ground as finely as may be considered desirable before making the test. Even thus more bluestone must be used, in proportion, than will be needed in the mill.

But this test can be better made in a bottle, by shaking, iron scraps being added in such quantity as to expose about the same proportional surface as will be the case in the pan. In this way, the pulp being made with hot water, and temperature maintained by occasionally putting the bottle into hot water, and the iron being previously coated with mercury by the means described, a fair imitation of pan-work may be got, both as to time required, as to proportion of chemicals, and as to results. I think, however, that the best way is to treat the previously powdered ore in a porcelain or enameled dish, over a coal-oil stove or

gas flame, with the requisite chemicals and quicksilver, and some scraps of iron which should be first amalgamated as above described, stirring the whole frequently by means of a glass rod or a stick. The iron surface should be approximately, in proportion to the weight of ore, similar to that of an ordinary mill pan.

A model pan, in all respects similar to the mill pan, but holding only a few pounds of ore, is sometimes used for these tests; it is, to a less extent, open to the same objections as the mortar; the extent of iron surface is too great for the quantity of pulp; that is, it is much greater than in a large pan of similar form. In all cases where a test is made on a small working scale, that is in pans, etc., which have been used before, the assay of a true sample of the tailings is a more reliable criterion of the work done than the apparent proceeds, because it is scarcely possible to clean pans or copper plates, etc., so that a subsequent operation may not be more or less vitiated, especially when poor ores follow rich ones.

It is in those cases in which a perfect *simulacrum*, on a small scale, of the proposed operation on a large scale cannot be obtained, and such, as I have said, are a majority, that the judgment and general knowledge of the experimenter or inventor are put to a severe test. As to proportions of chemicals, which should be strictly observed, it is generally, though not invariably, possible to make the necessary determination in the small way. In this respect, in many cases, I will undertake to do with a thousand tons that which I do with a thousand grains of ore.

But inventors of new processes have to consider a number of matters. A process requires an apparatus, and material which is available on a small scale, such as porcelain, glass, gold, silver and platinum, cannot, in many cases, be employed in working, either on account of cost, fragility, or the impossibility of manufacturing in the requisite sizes, or because the physical properties of a substance which answers for small machinery fail on a larger scale; for a substance does not become harder with increase of mass, and the tensile strength, resistance to flexure, etc., increase in a smaller ratio than the weight. An iron beam may support a great weight, in addition to its own, but, if the size should be increased indefinitely, a point would be reached at which it would no longer support itself. Machinery which works well and endures long when small, may work badly, or wear rapidly, when large. All of these matters must be carefully considered by the man who would successfully launch a new invention, whether in metallurgy or in another branch of industry, and it is precisely the neglect or inability to justly estimate their value that blasts the hopes of many honest inventors, and causes pecuniary loss to those who invest money in their schemes. C. H. A.

A Smelter for Los Angeles.

TO THE EDITOR:—With the prospects of an active smelter in the corporate limits of this city at an early date and a generally increased interest in mining in this section it looks as if we are indeed close to a genuine mining boom.

The smelter will probably be ready to buy ores in thirty, and for smelting in sixty days. Then southern California will surprise the world with the quantity of good smelting and other classes of ores it can produce. Several good properties are now being developed and ore taken out for shipment to the new smelter.

The question is often asked, "Is there anything in it?" etc., to which I will say that the foundation is being laid and several carloads of machinery have arrived. The chief promoter, Dr. Endlich, seems to be a polished gentleman of fine education and ability, having had much experience in the old country and in this. For years he was in the Smithsonian at Washington and is the author of an elaborate and excellent work in mineralogy.

Los Angeles is also liable to become quite a center for interest in the new cyanide process. We have with us now two gentlemen from Tombstone, W. H. and L. E. Aubury, who are among the few who have successfully worked out the practical details of the process. They have thus been treating ores in Tombstone for the past year and making eight and ten dollar silver ore pay. They have also made some valuable modifications of the process, in recognition of which the Denver Company has granted them special privileges in working ores. They are now arranging to erect large plants at several mines in southern California, and putting up a small one here in the city to demonstrate the practicability of the process on various ores. Like the amalgamation, the Russell, or any other process, it is, of course, applicable only to a certain class of ores, though to a greater extent than is generally supposed. Each case has to be determined by a practical working test.

Sampling works are also in prospect of being erected here soon. E. M. WADE.

Mines at Elk City, Idaho.

TO THE EDITOR:—Since my letter describing this camp appeared in the MINING AND SCIENTIFIC PRESS (Feb. 18th), a great many mining men have written me, asking information with regard to transportation, freight rates, water power, quality of ore and what hases are associated with the precious metals. I have answered all of them so far, but the mining season is here now, and it will be very inconvenient for me to answer so many letters. So with your permission, Mr. Editor, I will try and give all whom it may concern a short description of the camp, its resources and transportation facilities.

At present this district is connected with the outside world by pack trail only, but the Legislature of the State of Idaho at its last session, appropriated \$130,000 to build roads and open up the rich mining sections that are known to exist in the fastness of the mountains of this young State. A part of this money will be spent this summer in the construction of a good wagon road to Elk City, which will make 100 miles by wagon or stage to

Lewiston, the head of navigation on Snake river, and 115 miles to Union Town, on the Northern Pacific railroad.

Freight from Portland, Oregon, to Elk City, at present, is five and one-half cents per pound, but with the wagon road any common freight can be delivered here for at least four and one-half cents per pound.

The water power of the camp is practically unlimited, and very convenient, as the different groups of mines are cut by large bodies of water that can be controlled by dams and flumes, thus insuring cheap power sufficient to run almost any size milling and reduction plants. The altitude of most all the mines is less than 4,500 feet; the winters are mild, the thermometer seldom going below zero, consequently little time will be lost on account of cold weather.

With regard to timber, "the woods are built of it." The hills are covered with a very thick growth of black and yellow pine, red and white fir, tamarack and cedar.

The auriferous ore of the district is common iron pyrites. There is practically no other bases but the iron and sulphur. Occasionally a little arsenic or a trace of copper is found. There is no lead, bismuth, plumbago, or antimony; at least the assayers of the camp report none.

There are three or four lodes in the camp that run high in silver and carry considerable more bases than the gold ledge, but there being only a few of these claims they do not effect the general description of the camp.

M. L. MURRAY.

Elk City, Idaho, May 6, 1893.

The Texas Consolidated.

Shasta County's Big Mine in Old Diggings District.

Mr. L. S. Barnes, the editor of the *Shasta Democrat*, has been out to Old Diggings district visiting the Texas Consolidated mine, the property of R. G. Hart, and superintended by R. G. Hart, Jr. Mr. Barnes' description of the property is as follows:

The first thing of interest we inspected was the milling plant, erected on a solid rock foundation on the east bank of the Sacramento river, about a mile from the principal ore dump on the mine. The plant consists of twenty 850-pound stamps, eight Triumph concentrators, a Blake rock-breaker, four automatic ore-feeders, a Morris concentrating table, a large water pump, and a 50-horse power engine and hoiler, which furnishes the power that operates the whole plant, and enough power in reserve to operate 20 more stamps. The whole plant is a very substantial structure, covering a ground space of 150x60 feet. Forty tons every 24 hours is the capacity of the mill, using a 30-mesh screen in the batteries. The water that supplies the mill is pumped from the river into a large reservoir above the mill during the summer months, but during the wet season water is piped from ravines. The capacity of the Blake rock-breaker is 100 tons every 24 hours. The ore is delivered to the ore bins above the stamps by self-dumping buckets suspended to an endless steel wire cable. This portion of the plant was put up in November and December, 1891, and is known among mining men as the Hallidie wire tramway. The cable makes a circuit of about two miles, and at intervals of every 160 feet a self-dumping bucket is hung. As these buckets pass around the drum at the station at the mine dump two men fill them with ore, and a bucket of ore is dumped into the ore bin above the rock-breaker at the mill every 40 seconds. The capacity of the tramway is 50 tons of ore delivered at the mill every nine hours. It requires only two-horse power and two men to operate it.

From the rock-breaker the ore drops into bins that feed the automatic feeders that supply the stamps. Each battery of five stamps discharges through a 30 mesh slot screen onto amalgamating plates ten feet long and as wide as the batteries. The pulp from the batteries passes over these plates, is collected in troughs and distributed equally to eight Triumph concentrators, which save the heaviest sulphurets. But the output of the stamps is not done with yet. From the concentrators the slimes and fine concentrates pass on to a Morris concentrating table, which has 22 parallel runs, each about 16 inches wide. In these runs No. 2 canvas is laid, which collects and retains a large per cent of the slimes and light sulphurets that escaped the Triumph concentrators. Every one and a half hours these canvas strips are freed from gangue by the application of clear water, then the slimes and fine concentrates that have lodged on the canvas are hosed off into a long trough. Here the slimes and fine concentrates settle. This is the end of the process of saving the precious metals that the stamps free from the virgin rock. In connection with this plant is a complete laboratory and assay office. The fact that the tallings assay but a trace proves that but little value is lost in milling.

The mine is now known as the Texas Consolidated Mines, and consists of six patented and two unpatented claims, covering 7500 linear feet of ground, and a portion of it the width of two chains. The claims run from the base of the mountain on the west side to the east side of the mountain. There are three well defined parallel veins inside the patented ground. On the center vein on the claim originally known as the Texas & Georgia, most of the development work and exploring of ore bodies has been prosecuted. There are four main tunnels penetrating the ore zone, all run on the vein, and tunnel No. 5 is now in about 400 feet.

Tunnel No. 1 is in about 280 feet. At the end of this tunnel the ore body is about 14 feet wide at a depth of 160 feet from the surface. But very little of the ore above this tunnel has been stoped out.

Tunnel No. 2, which makes a level 96 feet lower than that of No. 1, is in 375 feet. About half the ore between these two levels is in reserve, and the vein for the full length of the tunnel averages about six feet, all milling ore.

Tunnel No. 3 is in 1240 feet. The pay chute is over 500 feet long in this tunnel, and the greatest vertical depth from the surface is 666 feet. The last 600 feet of this

tunnel is a drift that was driven to cut the east vein, and on the second of this month this drift encountered the vein at a depth of 660 feet. The vein at this point is 5½ feet wide with a 30 degree pitch to the east, or into the mountain, and the ore at this exposure is all high grade. We consider this the most important development in the history of this mine. The stoping ground in the chute between levels two and three is practically all reserved, and in places the ore bodies along the chute swell out to immense breadths.

Tunnel No. 4 is in about 900 feet, and about 580 feet of which is pay chute. In places the ore bodies swell out from six to sixteen feet wide from wall to wall, and we approximate the average width of the vein the full length of this level at about eight feet. At a point about 550 feet from the mouth of this tunnel a winze 80 feet deep is sunk on the vein. At the bottom of this winze the vein is 12 feet wide and 880 feet perpendicular from the surface, and all high grade ore. This is the deepest penetration in the mine or ore zone. For 500 feet along this ore zone between tunnels three and four, and an average of 40 feet high, the ore has been stoped out and milled, but the remainder of the ore between these two tunnels remains as a reserve in place.

Tunnel 5 has been started and is now being pushed ahead. This will give an approximate depth on the center vein of about 900 feet, and through this tunnel all the big ore reserve will pass to the mill.

To give the reader a fair illustration of the extensive ore bodies in this mine, it is only necessary to state that Foreman Ed. Hume has only eight men at work breaking ore to supply a 20 stamp mill. Another thing about the mine is the absence of culled ore around the dumps. Everything in the shape of ore goes through the mill.

The west vein is being developed by a crosscut from tunnel 3 on the center vein. The drift on this vein from the intersection of the crosscut is 90 feet and the vein averages about six feet. Some of the ore on this vein is stoped out clear to the surface, and some assorted ore has been shipped from this vein.

We are free to confess that the dimensions of the ore zone we saw in this mine was a complete surprise to us. We were not prepared to see anything like it. It is a big mine, and one that will make a record for Shasta county.

We must not forget to pay our respects to Foreman Ed. Hume, who piloted us through the many levels, stopes, crosscuts and drifts. The system of development here stamps Mr. Hume as an expert miner. Very little dead work is to be seen in the whole mine. Mr. Hume is a genial gentleman, justly proud of his achievements in this great mine, and is appreciated by the men under him.

Mr. R. G. Hart, Jr. is not only superintendent and general manager of this big property, but is also president of the Cleveland Consolidated mines, better known as the Bullychoop group of mines, on Bullychoop divide, between Shasta and Trinity counties. The mines are situated just over the line in Trinity county. Last summer he did considerable development work on this property and almost completed a new milling plant when the winter snows compelled a cessation of work. He will resume operations on this big property before the first of next month.

Old Diggings camp presents quite a thrifty scene. Besides the Texas Consolidated there is the Walker mine, superintended by H. D. Rippetto; the Crystal, Mammoth, the Reid group, and several other claims of lesser importance—the whole camp sustaining a population of about 250 or 300 people.

This trip to Old Diggings impressed us of the importance of water power, and that can be had. There is an old water right with an old unused ditch running up to the Pitt river to a point near its confluence with the Sacramento. This ditch could be enlarged so as to bring 1000 miners' inches of water through this camp at an altitude to give several hundred feet power. Enough power could be generated to drive all the machinery, either by water or electricity, this camp will ever need, and the water after this use could then be conveyed on toward Redding. A competent engineer has estimated that an expenditure of \$20,000 would bring that volume of water through this camp at an elevation of several hundred feet above any mill site in the camp. This is an enterprise that surely ought to attract capital if properly presented. There is an immediate demand for water power for the mines, and a large prospective demand for irrigation after the water would pass the divide between Quartz Hill and Old Diggings.

Diamond Digging.

I have just spent a few days among the river diamond diggers near Hebron on the Vaal, says a writer in the *Jewelers' Circular*. The work there is carried on by individual diggers, each man leasing his claim and working it himself with the aid of a few native laborers. They are a motley crowd, these diggers, and representatives of almost every nationality. It is a hard and precarious existence. Diamonds are few and far between, but when found, nevertheless, they are generally of first-class quality and realize high prices.

The diggers are mostly men of very small means. Their tools and washing gear are about all they have, and they consequently live very poorly. Meal of rough quality is often the only food that passes their lips from one month's end to another. They usually get on credit from some storekeeper, who furnishes them with the bare necessities of life on the chances of their finds. Most of the diggers, of course, have a find some time or other, though there are strange instances of ill-luck following the quest for diamonds year after year.

I had a conversation with one old man who had been at this sort of work for 19 years, and I am afraid to say how long it is since he had a turn of luck. He has lived nearly all this time on meal, and there he was toiling away at about the hardest work man can undertake, yet seemed

willing to go on to the end. This labor, however, though heavy, has a wonderful fascination for those who once take to it. A very fine stone had been found a few days before my arrival. It was valued at between \$2500 and \$4000. Towards the end of last month two brothers had a marvelous run of luck. They found stones to the value of over \$20,000 in a very short space of time.

Geology of Building Stones.

Of interesting sciences, there are none more so than geology—the study of the earth. The material substances about us, the handwriting of Dame Nature, is by the power human reasoning made to reveal the secrets of the past. With this mighty weapon, knowledge is well armed in the constant conflict with tradition, superstition and falsehood.

But there is to be found in this great historical storehouse one chapter that reaches its usefulness out to us in our everyday life, and adds an interest to what may at first seem to be things of the commonplace.

It will say "stones for building." To the layman this conveys little more than the idea of a block of hard material that has proved a very useful thing with which to construct a habitation. To the architect it conveys a feeling of pleasure, a friend of great possibilities; while to the mason it is the staff, the rib of his existence. But to the geologist, the words are of significance—the rib of the world. Of these, which is the more exalted? Let us listen to the geologist. With pleasure, if he will drop the isms and asms of the technical.

Order is one of the first and best laws of nature. The geologists are orderly, or nothing. Thus they began a classification in the earliest stages of their investigation of the earth's rocks. In the first arrangement, such rocks as were supposed to have been original in their formation were called primitive, and such as were composed by the disintegration of others were called secondary. In the primitive rocks there are never found the remains of organic substances, as shells or plants, from which fact we infer that they were formed prior to the existence of life in any form. On the other hand, the secondary class often contained fossils of all kinds, and portions of what must at one time have been primitive rocks. But these early scientists were entirely too simple in their nomenclature for the modern schools. Since that time, the latter have been busily engaged in inventing new names, and championing them abroad after their invention.

For the use of the layman, however, an easy classification of rocks is as follows: 1, primary; 2, transition or intermediate; 3, secondary, (a) lower secondary series, (b) upper secondary series; 4, tertiary; 5, basaltic and volcanic; 6, diluvial and alluvial.

Before taking these up, I should not forget to mention what a rock is.

"Oh, everybody knows what a rock is."

All right then, what is it?

"A rock is a—a—rock."

I thought so, too. A rock is an aggregation of minerals, occupying a definite position in the earth's structure. It could be one mineral as well as more than one, out as a matter of fact the pure mineral is never found.

The primary rocks are the ground work of the globe; they are the ribs of the world. They rise into lofty mountains, and are the floor beneath which we have never penetrated. One of the most notable of these rocks is granite; I might better say granites, for the number of kinds is legion. However, the differences are very small, indeed, being more in what are really impurities than anything else. The usual three minerals are found in them all—quartz, feldspar and mica. Quartz is a white, glassy substance that breaks in an irregular manner. You have often broken the smooth, white pebble that so often abounds wherever there is running water? Ten chances to one that pebble is quartz. It is the mica in granite that sparkles so. The bits are small sheets or leaves, very small indeed, but still abundant enough to give the greenish tint so often noticed. Large pieces of this same mica is called isinglass, and is certainly familiar.

Other primary rocks are gneiss (pronounced like the word nice), mica-slate, clay-slate, primitive limestone, porphyry and syenite. They are all, as a rule, crystalline in their structure, and never contain remains of organized substances or portions of other stones. By organized substances, we mean living things, as plants and animals.

Gneiss and mica-slate are composed of the same materials or minerals as the granites, only arranged somewhat differently. The grains are, as a rule, very much smaller than in the granite. In gneiss, the quartz and feldspar are very closely aggregated, while the mica is arranged in scales between strata of the same. Hence it is that gneiss is really a stratified rock, and if a section or break be made at right angles to the strata, it will present a striped appearance, for the quartz and the feldspar are nearly white and the mica a narrow band of green. Often the mica is a deep black.

Mica-slate is composed principally of quartz and mica and a very small portion of feldspar. The latter is sometimes all but absent. The quartz is commonly in the form of fine sand, and the mica in flakes. The latter predominates and sometimes seems to be the entire composition of the rock. Mica-slate differs from gneiss in having a small portion of feldspar; and more in the positive stratification which is so marked that it is easily separated by wedges into plates or layers. An example of the latter quality is found in the common flagstone.

These three stones—granite, gneiss and mica-slate—form what is known as the granite group, and together they form the major portion of the earth's crust. The gneiss is intermediate between granite and mica-slate in its structure, and is often found between these rocks, lying over the former and under the latter. Sometimes the transition is so gradual as to be hardly perceptible, the granite growing to a stratified gneiss and the latter as slowly into fissile mica-slate.—Edward C. Weaver, in *Stone*.

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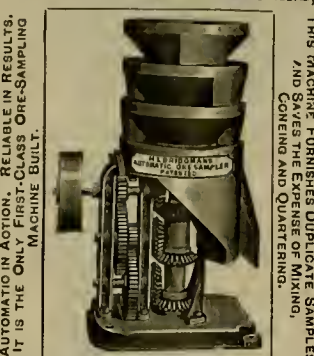
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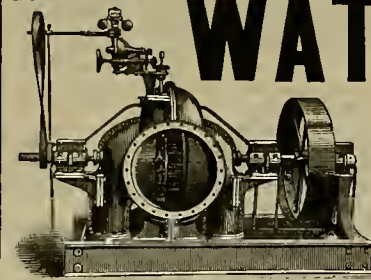


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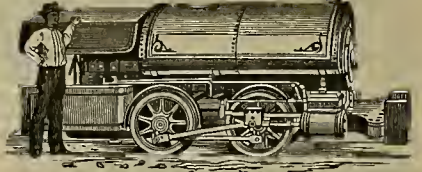
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Mechanical Progress.

Advanced Speed Records.

A dispatch from Buffalo, N. Y., dated May 9th, says: The New York Central Railroad's Empire State Express broke all railroading records this afternoon in a run from Rochester to Buffalo, attaining a speed of 102½ miles an hour. The train was drawn by the new Columbian engine, No. 999, which will be sent to the World's Fair. Miles were made in from 42 to 50 seconds right along until Corfu was reached. The distance from Corfu to Crittenden, four miles, was made in 3½ minutes, and the two miles between Wende and Looneyville were rolled off in 1½ minutes. The track from Looneyville to Forks station is as solid as a rock and well adapted to record breaking. The distance is nine miles and it was run in 6 minutes and 58 seconds. Just before the Forks was reached a mile was made in 35 seconds, timed by a stop watch. The 69 miles from Rochester to Buffalo were made in 68 minutes.

On May 11th, another dispatch says: The great Empire State Express engine 999 has broken her record of 102 miles an hour, which she made last Tuesday. The test was made between the Rochester depot and Buffalo yesterday. After Batavia was reached Engineer Hogan let her out, and the engine, hauling the great Empire Express train, was going at the rate of a mile in 35 seconds at Crittenden. Beyond Crittenden the world's record of a mile in 32 seconds was made. This is equivalent to 112½ miles an hour. This tremendous speed was kept up until Forks station was reached. There was no unusual swinging or jolting.

Another great record is that of the new steamer Campania, thus announced in dispatches from Queenstown dated May 12th: The new Cunard steamer Campania arrived this morning from New York, beating the record of the eastward passage, doing it in 5 days, 17 hours and 42 minutes. There is great jubilation over the victory.

It was a race between the Campania and the Paris of the American line. The Paris passed Sandy Hook lights at 10:58 A. M. Saturday, May 6th; the Campania at 11:13. The latter gained steadily on her rival and passed her 109 miles east of Sandy Hook. From that time on the Campania did not sight the Paris. The best previous eastward time was that of the American-liner New York, last August—5 days, 19 hours and 57 minutes.

The first trip of the Cunard Company's first boat, the Britannia, was made in 1840 and occupied 14 days and 8 hours in its run to Boston. This boat had a capacity for only 115 cabin passengers, while the Campania, its latest successor, can carry 600 first class, 400 second class and from 700 to 1000 third class. On her trial trip on the Clyde she attained a speed of 23½ knots, equal to 27 miles an hour, a record unsurpassed by any steamship, and on her maiden trip she made the distance from Queenstown to New York in 6 days and 4½ hours. This for a maiden trip was a remarkable record and fully bore out the expectations of both her builders and owners.

The Campania has 12 main boilers and two auxiliary boilers. The 12 main boilers are double ended, 18 feet in diameter and 17 feet long, each having eight corrugated furnaces, four at each end, with a combustion chamber in common to each pair of furnaces. Of the auxiliary boilers, one is 18 feet in diameter by 11 feet long, with four furnaces, and the other 10 feet in diameter by 10 feet long, with two furnaces. These two auxiliary boilers are intended primarily to furnish steam to operate various appliances about the ship, but they are so arranged as to be used in connection with the regular battery for driving the ship when required. The main boilers are the largest yet made for the pressure required—165 pounds. The plates were supplied by the Steel Company of Scotland and are 17-32 inches in thickness, some of them being 20 feet long by 7 wide.

At Liverpool, on May 12th, the Campania landed her passengers at 10 o'clock, and thus beat all previous records. She steamed from Queenstown to Liverpool in 10 hours and 3 minutes, or at the rate of 22.48 knots an hour. The officers of the Campania cannot say enough in praise of her engines and sea-going qualities. The Cunard Company is receiving numerous telegrams of congratulation.

LIFE-SAVING KITES, invented by Prof. J. W. Davis, were successfully tested near Newport, R. I., on April 24th. A kite was sent in a 25-mile breeze from Breton's Reef lightship to the shore, 1½ miles away, carrying with it a life-line. One mile of line ran

out in 41 minutes. The two kites used were in the shape of six-pointed stars, seven feet in diameter, and covered with oiled duck. The first kite was attached to a float at the end of the life-line and the other half a mile back of that. The life-line was manilla, one-fourth inch in diameter, rated to bear a strain of 780 pounds. This line terminated in a loop, and about 20 feet back was slung a solid wooden 32 pound buoy.

Cheap Clocks and Watches.

A correspondent of the *American Machinist* says: At the Waterbury Clock Company's works, where they are at present turning out about 1500 clocks per day, there is much to be seen that is of interest, especially in the way of tool work, which is very finely done. In one room 45 automatic screw machines are at work, making not only the screws but many other of the small parts of clock movements which in the old days were made on hand lathes of special design. Some of the work must, of course, still be done in this way, the tools used, however, not being the usual hand tools, but tools set in a square bar of steel, the ends of which are turned cylindrical for some distance and rest in supports upon which the bar slides along to take the cut, the tool in action being supported upon a rest which is placed near the work. The various tools are held in the bar by set-screws, and are adjusted in it to give the proper diameters of the various parts of the piece operated upon, and the bar turned from one tool to another does the work very rapidly.

An interesting line of work is being developed here at present which is the outgrowth of the fact that the company found that one of their smaller sized clocks was being carried by many people as a watch. It was, of course, rather large for this purpose, but the fact that it was so used led to its being modified, particularly in the way of reduction of thickness. The result of this is that the time-pieces are now being made so that they can be used either as clocks or as watches, and the system by which they are made admits of their being sold at retail at \$1.50. They are neat in appearance—rather large to be carried in the pocket of a full dress suit, it is true, but very acceptable for many uses, and I can, within reasonable limits, give no better idea of the efficiency of the processes by which they are made than to state, as I have done, the retail price, which includes, of course, about three profits above the actual cost of manufacture.

The name of the Waterbury watch is associated in the minds of many people with extreme cheapness and a quality in keeping with the price. The factory and its equipment, however, are mechanically of a very high grade. The original factory was contracted for from the foundation of the building to its complete equipment in working order by the American Watch Tool Company, of Waltham, and as might be expected, the contract was carried out in the best possible manner; the shop, its equipment of tools, the arrangement of them and of the tool rooms, store rooms, power plant, etc., being very admirable, as is also the cleanliness, order and evidence of good management that prevails the place. The original Waterbury watch, however, which the boys in the shop used to wind up by holding the stem against a running belt, has been abandoned and various higher grade watches are now made which are cased in any desired manner, the company claiming the distinction of now producing the thinnest full-sized watch made. In one moderate sized room of this factory are small automatic and other machines to the value of about \$125,000.

SIXTEEN MINUTES' SHOES.—When one looks back a hundred years and thinks of the days of tedious traveling it took to make the journey from Boston to New York, and then calls to mind the magnificent new compound locomotives which are capable of drawing a train of cars at the rate of between 75 and 100 miles per hour, he is struck by the wonderful progress which has been made in mechanical science during the current century. Yet, as great as has been the change in our modes of locomotion, it has been no greater than that which has occurred in other fields. For instance, it was but comparatively a few years ago when Henry Wilson, afterward Vice-President of the United States, was laboring at the shoe-bench, spending hours, and probably a day or more, as did all his fellow-workmen throughout the world, in making a single pair of shoes. Now machines for doing this work have been so highly developed that this week a pair of shoes was actually made in Lynn, from beginning to end, including the sewing on of the buttons and the packing of the pair in the box, in the almost incredibly short time of less than 16 minutes.

The compound locomotive and the 16-minutes' shoes are not exceptions, but only examples of what has been accomplished throughout the entire list of mechanical industries.—Manufacturers' Gazette.

Scientific Progress.

Iris Glass and Its Composition.

There are often seen on the market fancy articles of glassware, such as vases, bonbonniers, salvers, trays for visiting cards, paper weights, lamp shades, etc., the surface of the glass being so treated as to possess all the rainbow colors, changing one into the other in different lights, known as iris glass. The method by which this beautiful effect is attained is described in the *German Journal, Die Glashutte*, and is given below. It is done by the glassblowers at the furnace, in an apparatus which consists of a sheet-iron cylinder 20 inches long and 8 inches in diameter, standing vertically, having a similar cylinder riveted across the top, making a T-shaped muffle. In the lower cylinder is an opening into which an iron ladle can pass. The horizontal cylinder is provided with doors at either end, the one nearest the workman being so arranged that the blow pipes can be supported when the door is closed in a horizontal split running to its middle, the article to be treated being held inside. The whole apparatus is placed on the work bench, convenient to the glassblower. While the latter is re-heating his work for the last time in the furnace, the helper takes the long-handled iron ladle, which has been heated red hot, and shakes into it about a spoonful of the mixture given below, and places the bowl of the ladle quickly in the opening provided for it in the vertical cylinder. The mixture immediately gives off vapor, which rises to the horizontal cylinders, where, in the meanwhile, the blower has placed his work, supported by the blow pipe, and heated to an even red, turning it rapidly in the vapor. After a little while the object is covered with a changeable luster, is removed from the pipe and tempered in an ordinary oven as is other ware, and afterwards cut, engraved, painted or gilded, as desired.

The chemicals which make up the mixture that gives off the coloring vapors are the same as those used to give the brilliant hues to rockets, fireworks, etc. Strontium monoxide gives red; strontium nitrate, rose; barium monoxide gives blue; barium chromate, green; chloride of zinc, white. A flame-like luster will be given by either of the following receipts, the ingredients being carefully mixed on a plate: One part by weight powdered oxide of strontium, one part by weight powdered oxide of barium, two parts by weight powdered oxide of zinc; or one part by weight chromate of barium, two parts by weight oxide of zinc.

The Electrical Congress.

One of the most important features of the gathering of electrical people at the World's Fair this year will be the meetings of the Electrical Congress in connection with the exposition. This congress, it is anticipated, will be composed of representative scientists from every part of the world, and the work they have in hand will be of great interest and importance to the industry generally. Former gatherings of this description have awakened considerable interest, and some of them have been instrumental in bringing about advancements in the art and the determination of points of controversy. None of them, however, have had the excellent opportunity which is presented the congress which will assemble in Chicago this year. Upon the question of program Prof. Carhart says: "The committee having charge of this important congress has been alive to the interests involved and the responsibility of making the most of the opportunity in the interest both of the science and the applications of electricity. The occasion is a fitting one on which to settle in an official way the matter of electrical and magnetic units and nomenclature for years to come. With this in view, provision has been made for an official or legislative council, the members of which shall be appointed by the Governments which they represent. To this council shall be submitted all questions bearing upon the adoption of units and terms. After the legislative council has passed upon the questions coming before it, the units adopted will only need ratification by the several Governments represented to become truly and legally international." The official character of the congress, together with the standing of the men who will compose the body, will lend great weight to its decisions. The fact that the meetings will be held under the sanction of the Gov-

ernments represented will greatly influence the public in accepting its decisions. Marked contrast is shown between the congress of 1881 at Paris, that held three years later in Philadelphia, and those of more recent years with which we are all familiar. These proceedings, while interesting, instructive and valuable, did not attract the wide attention or receive the same consideration as those of the original congress at Paris. It is believed that the Chicago congress, by reason of its official character and the eminence of the men who will participate in its deliberations, will even out-shine the Paris assemblage of 1881. This is to be hoped, at least. The gentlemen in charge of the arrangements have availed themselves of the experience and advice of the leading electrical scientists of this country and Europe.—Western Electrician.

Diffused Light.

The London *Electrician* reprints an article from a Viennese gas journal, on indirect lighting, which gives some interesting results regarding diffused light. With ordinary lighting, six seats on one bench in a lecture room in the university had an illumination of 8.4, 12.7, 45.8, 74.9, 16.9 and 11.0 metre-candles, respectively (one metre candle is about equal to a foot-candle). Various mirrors and reflectors were then introduced below and above the lights, so that the illumination consisted entirely of diffused light. There was then no shadow and no reflection from the walls, the flames were out of sight and the objectionable heat from the lights did not radiate downward; the room seemed to be divided into two zones, the upper one bright and the lower one dark; the only defect was the comparative darkness of the lower part of the room. Measurement showed that with the same consumption of gas the illumination in the brightest place was 26.15 metre-candles with direct and 8.59 with indirect lighting, and that in the darkest place was 16.58 and 6.74, respectively; the average was 21.33 and 7.64, showing a loss of 64.2 per cent. The illumination was not sufficient in the second case, as it was found that nothing less than 10 metre-candles (or about one foot-candle) was sufficient. The walls of the room were then painted a pure white; the averages then were 24.01 and 9.11, or a loss of 62.5 per cent. A semi-transparent reflector of paper was then substituted; the averages were then 21.01 and 9.94, or a loss of 52.7 per cent; paper, however, is not a good material, as it discolors. Milk-glass was then tried, as it was, to some extent, both transparent and a good reflector; the room then looked much brighter; the averages then were 27.05 and 17.48, showing a great increase; the loss was thereby reduced to 35.6 per cent, and the worst-lit part of the room was found to be sufficiently illuminated; the lighting, however, was not so uniform with a semi-transparent reflector and the shadows were not entirely absent.

Explosion of a Storage Battery.

Mr. F. C. Bliss, of the Bliss Engineering Co., Washington, D. C., sends us an interesting account of an explosion of a storage battery which, fortunately, in this instance, had no serious results. Seven Julien cells being charged from a 110-volt circuit with 10 amperes, were disconnected while in circuit by disconnecting the wire joining the middle cell to the adjacent one, in order to put in another cell. At the instant of breaking connection there was a vivid flash followed by a loud explosion; the cell was completely wrecked and several persons standing near were thrown backward and deluged with acid. The heavy iron clamps which secured the top to the sides of the cell were forcibly broken and the iron handle thrown to the ceiling, breaking out a section of lath and plaster where it struck.

The explosion, of course, was due to the spark caused by breaking the circuit igniting the uncombined hydrogen and oxygen gases in the cell. A similar accident occurred in Pittsburg several years ago with serious results. In this case the cells were in a box closed with a lid, and the explosion occurred while an examination was being made by the aid of a candle, the flame of which ignited the gases that had accumulated before the lid was raised.

Other cases have been noted, and, as uncombined gases are always present near the end of a charge, due to the fact of the plates only taking up a portion of the gases released at that time, great care should be exercised in approaching a light or breaking a connection where the situation is such that the gases may have had an opportunity to accumulate. Closed cells such as are used with phonographs are particularly liable to this accident.—Electrical World.

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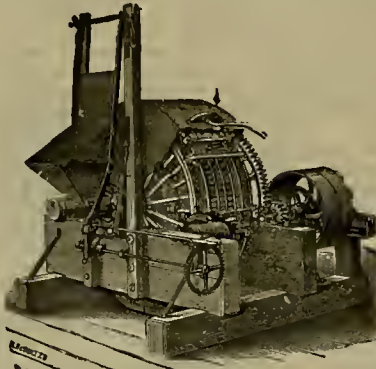
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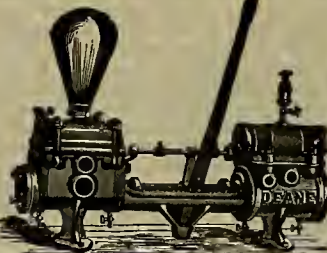
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Electricity.

An Abused Science.

The public is less credulous and superstitious than it was a thousand years ago, says the *Manufacturers' Gazette*, but the difference is not so great, considering our material and intellectual progress, as to be the source of any especial pride to the present generation. It is true we have to a great extent outgrown a belief in constantly-occurring miracles, the worship of holy or unholy relics, and the fear of human and demoniacal witches; but it is an open question if as much ignorance and blind superstition do not exist, although manifesting themselves in different ways, among us to-day as were in the world during the dark and middle ages. Thousands upon thousands of persons would no more think of being married or set out upon an ocean voyage upon a Friday than they would think of eating a dynamite cartridge for breakfast. A similar inherited dread is shown by the same persons for crossing a funeral procession, for being the thirteenth at a dinner party, or seeing the new moon over the left shoulder. These are the persons and they are legion, who enrich the modern astrologers, the so-called "metaphysicians," the faith cure doctors and the Christian scientists. They make a demand for chicanery of various kinds and there are not wanting those who are capable and eager to supply their wants.

The medical profession has probably suffered more from these miserable and mercenary quacks than has any other. The doctors and the science of medicine, however, have endured hardly greater injury than have the reputable electricians and the science to which they have devoted their lives. The public as a whole knows comparatively nothing about electricity. It sees the wonderful things it has and is doing, and naturally it is easily led to believe that there is nothing beyond its power. The mystery which surrounds the working of the force forms thus a very convenient shield behind which electrical shysters may conceal the worthlessness of their contrivances, and thereby easily persuade their gullible victims that, although the claptrops which they have to sell may give no ocular or tangible proof of possessing any value, they yet come under the same laws which control all electrical mechanism.

What these devices are which have done so much to degrade the name of electricity and magnetism, and which are awakening in the intelligent public such distrust of almost everything that is called electric or magnetic, it is not necessary to name in particular, even had we room in a single number of the *Gazette* to do so. There is the long string of so-called "electric" medical wearing apparel, each of which is claimed to have wonderful curative powers because of the electricity or magnetism which is generated while it is being worn. One need but know only the very first principles of electricity to see in an instant that all such contrivances are absolutely worthless, and that the makers depend for their sale solely upon the magic of the word "electric" or "magnetic" attached to the article.

Many of these deceptions have a row of alternate copper and zinc plates sewed on to a cloth which it is intended the invalid should wear around some part of his body, next to his skin, the claim being that the perspiration of the wearer, acting on the metals, will generate a current of electricity which will cure various kinds of ills when all other means have failed. The first thing that strikes one on examining the contrivance is that the circuit being of the same potential throughout its length it is impossible for any current to be generated. The second is that if any current by any possibility did manifest itself it would be of such slight force that it could be applied to a flea without making it jump. The third is that a current, even though many times more powerful than any that could be manufactured by the article, would not leave the metallic surfaces to enter the body, and if it did it would have not curative power whatever, at most only acting as a stimulus to the muscles.

Thousands of persons are made to believe that they can be cured of some disease, or at least relieved from its pains, by wearing in the soles of their shoes a few metallic plates arranged in a certain way, and hundreds of others buy and wear "magnetic" rings for the same purpose. These persons should not have thrown from their pockets their old horse chestnuts, which were a great deal cheaper, and not one whit less efficacious. The dry-goods merchant who bought a lot of flannel, and finding it going too slowly, marked up its price and sold it as "electric cloth," claiming for it wonderful curative powers, well understood the gullibility

of his customers, and reaped a handsome reward for his vicious shrewdness.

This is not the only way in which reputable electricians and electrical manufacturers are made to suffer, and their science is brought into disrepute and suspicion. The country is flooded, so to speak, with condensed electricity, spurious electric and magnetic machines, "electric" this and "magnetic" that, which are made simply to sell, and which prove, so far as practical work is concerned, absolutely of no value. It is not only the buyers of these frauds who are injured by them, but the manufacturers of genuine electrical goods suffer as well, for the disgust and suspicion which are aroused fall like the rain upon both the just and unjust.

The Phenomena of Resonance.

Nikola Tesla, the famous electrician, in an interview in the *New York World*, says:

"In the experiments of transmitting power by means of wires the phenomena of resonance is to be observed. If one tuning fork, for instance, is set into vibration, another one of the same pitch, anywhere within reasonable distance, will respond. That is a familiar phenomena of sound termed resonance. Now, if I set up these etheric vibrations that I speak of to a certain pitch, and my wire is within reach of these vibrations (not necessarily metallically connected) it will respond, provided its pitch corresponds with that of the etheric vibration."

"In that way I obtain energy in another conductor without any metallic connection whatever. Where a single conductor is connected with the source of vibratory energy these waves surge back and forth in that conductor very much as water would in a tube when you reverse it back and forth."

"One of my most interesting experiments is with the incandescent lamp with a single wire to it. I place in the center of this a piece of very refractory substance of any kind and connect that with the source of vibratory energy, and with this as a center, these etheric waves are sent out in concentric spheres and are reflected back from the inner surface of the glass globe upon this small piece of refractory substance. The impact of the molecules of rarified air in this globe creates such intense heat in this refractory substance (which is the focus) as to bring it to a high state of incandescence. It is difficult to find a substance that will stand that heat, but I have found some substances that will stand it fairly well."

"The transmission through the earth can be effected at any distance; in fact, it matters little whether the distance is small or great."

"Such a result, if achieved, would, of course, be of incalculable value to the world and greatly advance the progress of the human race. In this great country (of which I am proud to be a citizen) we have water powers which, in aggregate amount, are sufficient to supply all the needs—in fact, far more than the needs—of the whole human race. Take, for instance, Niagara. This famous waterfall is estimated variously all the way from five to six millions horse power. Now, four millions horse power, economically directed, would light every lamp, drive every railroad, propel every ship, heat every store and produce every article manufactured by machinery in the United States."

"It will not be long before we can transmit that power under quite practical conditions, by means of wire with the alternating system, over distances as great as a thousand miles. Engineers now object to the use of very high pressures, which would be necessary in such transmissions of power. But I believe the time will come when we shall transmit that energy without any wire."

"Since I have experimentally proved that we can get back electric impulses over one single wire without any return, we may avail ourselves of the earth as a medium of transmission as one difficult obstacle to overcome. In fact, the only serious objection to this scheme is to find a means to concentrate the energy of vibrations spread over a great area on one spot."

"If this power is to be transmitted across the ocean it will, of course, involve the expenditure of an enormous quantity of energy. It has been suggested that I can produce a set of lenses made of asphaltum or gutta percha or any other good so-called non-conductor of electricity, and can concentrate these rays, or waves, to a focus where their effect would be powerful."

"This plan, if at all practicable, could be applied as well across the Atlantic as it could at shorter distances on land."

In view of the fact that England possesses one of the, if not the most effective and cheap telegraph systems in the world, it is not without interest to ascertain exactly at

what cost the nation obtains this service. In 1870 the Government bought up the telegraph companies at a cost of something like seven and one-third millions sterling. Since that date the capital account has been increased to close upon eleven million pounds sterling, involving an annual interest and charge of £300,000. The telegraph service of the United Kingdom has, since its purchase by the Government, resulted in a total loss of four and one-half millions sterling. For the year 1891-92 the total loss was nearly £400,000, though the actual excess of working expenses over income was only £90,000. I venture to think, writes the London correspondent of the *Electrical World*, that if these figures were better known to the public they would acclaim with less enthusiasm the ingenious demands of certain gentlemen to still further lower the telegraph tariffs.

Reliability of Tests.

The aversion shown by many to reports of efficiency and other tests has a true foundation independent of a suspicion that the results have been "cooked" for interested purposes. In a test of even simple character a constant exercise of judgment is necessary, while nothing should be taken for granted in regard to the reliability of the instruments used. These remarks may seem trite, yet they are none the less important and their application is too often lost sight of. The former applies particularly where the conditions of a trial are variable, or where a personal estimation of some point enters into the results. In engine trials it is usual to assume the indicator to be correct, yet recently a large number of indicators of a standard make were rejected because not one fulfilled the requirement of a maximum error of two and one-half per cent; the error of a low-pressure indicator may easily be eight per cent, and in any case the readings of an indicator cannot be true at every part of the scale. An example that recently came under the notice of the writer was in relation to the test of an electric-light engine, which proved so unfavorable that the owner thought of replacing the engine by another. An examination of the data showed that the "expert" had taken the mean of two trials, one of 12 hours and another of only several hours' duration; while the former gave satisfactory results, the latter, through wrong estimation of the condition of the fire (or none at all), gave a result entirely too high. In another instance an "electrical engineer" lost his position because the data from his test of a dynamo gave an efficiency of over 100 per cent, on account, it was subsequently discovered, of the instruments reading incorrectly; had the efficiency come within the limit it would probably have been accepted without reference to the instruments. In a certain manufacturing establishment the weekly report of the engineer regularly shows the consumption of refuse coal per horse-power per hour to be between 1.5 and 1.6 pounds, the engine being of the compound-condensing type. These examples may be extreme, but they belong to an important class whose effect tends to cast suspicion on tests generally; even an extended examination of published reports of tests by professional experts of a given type of engine will be found far from reassuring. In order that errors other than those of observation may be checked, all reports, to have serious consideration, should be accompanied by an exact and certified transcript of the original data sheet, on which there should be no corrections, even of supposed palpable errors, which may, in fact, be the means of a proper interpretation and estimation of the test.—*Electrical World*.

Useful Information.

Household Uses of Electricity.

Science has provided man with many inanimate servants, comparatively few being the inventions of earlier ages, the more numerous and important ones belonging to our own times. Among these, obviously, the servants actuated by electricity stand pre-eminent, not only as the latest development of energy, latent and almost unknown in the ages of the past, but as the most generally applicable and manageable of all agents for doing work; and, while in its present stage, it is not a true prime mover, being dependent upon water power, wind power and steam, it serves as an efficient translator and distributor of other forces, so that it can be made to do not only much of the drudgery of life, but to perform the small tasks of every day.

The dwelling without electric bells, electric gas lighters, burglar alarms, the district telegraph for summoning timely aid in the

person of the district messenger, the police or doctor, or that is still without the telephone, is far behind the age; while the house having all these, in connection with electric lights, motors for driving the sewing machine, water pump, clothes-wringer, the mangle, the dumb waiter or elevator, is only fairly modern; but to be strictly up with the times the house must be provided with electrical cooking, water-heating and house-warming apparatus. It must have synchronous electric clocks in all the rooms, and it must also be provided with electric registers for recording certain operations in the house, such as the opening and closing of doors, safes or cabinets, and similar uses, for indicating the level of water in tanks, driving ventilating apparatus controlling temperature and the flow of air, for locating a fire, should one occur, and turning on water for extinguishing it, at the same time sending the alarm to the Fire Department. The electrical piano may take a place in every house; it will be operated by a first-class performer by means of a master piano at a central station, which will distribute the music throughout a large district; and it is not too much to expect that the more pretentious homes may be provided with a full orchestra operated in a similar manner from a distant station.

The story of the summer outing will not be complete without a full line of lantern transparencies, which necessitates an electric lantern for throwing them upon the screen. Every dining table will be provided with electrical heaters and coolers, by means of which coffee, tea and other liquids may be increased or diminished in temperature to suit. Where smoking is admissible, electric cigar-lighters come in place of the old-time match. The hall and conservatory will be provided with electric fountains illuminated at night by electricity, and, in the conservatory and garden, the shrubs and flowers will be illuminated by small lamps placed within the flowers and among the leaves and branches. Electrical clothes-brushes and carpet sweepers are forthcoming; possibly a toothbrush in which the necessary movements are produced by a suitable electric motor might be a desideratum.

The drawing-room, and in fact the entire interior, will be ornamented by means of electrical devices, some of them depending more or less upon electric illumination, while the others require the current merely for producing certain motions. The illumination of pictures will be effected by small lamps inserted within frames of such construction as to throw the light upon the picture and at the same time screen the lamps from view, so that the pictures may be fully and artistically illuminated, while the light in the gallery is made soft and subdued, thus permitting of concentrating the entire attention upon the pictures which will then be seen to the best advantage.

It is improbable that ere long the lady of the house will be enabled to see from within a visitor at the door, through the medium of electric wires, and that the weight and general dimensions of the person may be appreciated at once, so that the desirability of a personal interview may be determined upon in advance.

By a modification of some of the existing autographic telegraphs, or by a new invention of the same class, a letter written in one home can be instantly transmitted to another at a distant point, thereby outdoing the most efficient mail service. With the current accessible, it is not improbable that every family will have its electrical carriage always ready to roll out on the street and travel a number of miles without fatigue or danger.

Where the house is not fully modernized, and the occupants persist in burning coal locally in the furnace or range, instead of having it burned more economically at a central station, the heat now wasted will be utilized to the last degree in generating currents for lighting purposes and for power. The feasibility of this scheme has already been demonstrated, and improvements are constantly being made which, without doubt, will result in final success.—George N. Hopkins in *The Independent*.

WHILE the Chinese system of smelting (tin) is similar to that of the Malays, it is more elaborate and carried out on a much larger scale. In place of the bamboo bellows, a very ingenious plan is adopted. The trunk of a tree about 18 inches in diameter and 10 feet long is carefully hollowed out and closed at either end. A long pole with a circular piece of wood at one end, fitting exactly into the bore of the tube, acts as a piston. In order to secure the tube being perfectly air-tight, the end of the piston is well padded with feathers. Valves are placed at each end to allow the air to enter, and in the center the nozzle of the bellows

communicates with the furnace by means of a small air passage. On the piston being drawn out, the air in the higher portion of the tube is forced down the nozzle, and, being drawn back, the air in the further part of the tube is similarly drawn into the furnace. The charcoal is soon brought to a white heat and ready for the molds.—Consular Reports.

AMERICAN INVENTORS.—Many great American inventors have earned world-wide fame: Fitch and Fulton for steamboats, Whitney for the cotton-gin, Evans for milling machinery, Whittemore and Jenks for looms, Terry, Ives and Jerome for clocks, Wood for plows, Lorillard for tobacco-making, Edwards for leather-making, Blanchard for lathes for turning irregular forms, Spencer for geometrical lathes, Hoe, Adams and Gordon for printing presses, Collins and Root for ax-making, Ames for shovels, Woodworth for wood machinery, Fairbanks and Howe for scales, Howe and Crosby for pin-making, Knott and Mott for stoves, Stuart for sugar-refining, Baldwin and Winans for locomotives, Pullman for sleeping cars, McCormick and Ketchum for reapers, Colt, Spencer, Sharp, Smith and Wesson for firearms, Phillips for matches, Wells for hats, Goodyear for India rubber, Ericsson for naval construction and hot-air engines, Howe, Wilson, Singer, Gibbs, Grover and Baker for sewing machines, Morse for the telegraph, Taham for lead pipe, Whipple for screws, Chickering and Steinway for pianos, Burden for horseshoes, Yale for locks, Roehling for wire cables, Corliss for steam engines, Disston for saws, Stephenson for horse-cars, and Gatling for quick-firing guns.

SMELTING METALS BY ELECTRICITY.—A new process of smelting and casting metals is described by *Invention*. It is called the Tausig system, after the inventor, a German, whose place is at Bahrenfeld. The method of treatment is claimed to produce, by a single process, in a quarter of an hour, with an expenditure of some 300 cwt. of coal per 1000 cwt. of finished cast metal, bronze, iron, steel, copper, brass, zinc, platinum, gold or silver, free from air flaws, blowholes or babbles. The process is stated to be effected electrically by means of metal electrodes placed in an exhausted furnace, large molds being set up outside the same and exhausted simultaneously by one process. Castings up to 30 pounds of iron have been made, it is reported, within 15 minutes, the air pump in use showing 92 per cent exhaustion of air, amperes 2500 and voltage of 2½. Mr. Pogson, the British Vice-Consul at Hamburg, reports the matter to his government.

A FRENCHMAN states that there are 51,000 breweries in the world. Germany easily leads with 26,240, which produce 4,750,000,000 litres of beer yearly, a litre being equal to about 1¼ pints. England comes next with 12,874 breweries and an output of 2,600,000,000 litres; then the United States with 2300 breweries and 3,500,000,000 litres; Austria, with 1942 breweries and 1,300,000,000 litres; Belgium, with 1270 breweries and 1,000,000,000 litres; and France, with 1044 breweries and 800,000,000 litres. In Bavaria the annual allowance of beer per head of the population is 221 litres; in Berlin, 191; in Belgium, 169; in England, 143; in Switzerland, 31; in Denmark, 33; in the United States, 31; in Sweden, 11, and in Russia, 5.

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July 12, 1890.

State of California, City and County of San Francisco.—We, On this 12th day of July, in the year one thousand eight hundred and ninety, before me, George T. Knox, a Notary Public in and for said City and County, duly commissioned and sworn, personally appeared Samuel B. Connor and Andrew S. Grant, known to me to be the persons described in, whose names are subscribed to, and who executed the within and annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof, I have hereunto set my hand and affixed my Official Seal, the day and year in this Certificate first above written.

[Notarial Seal]

GEORGE T. KNOX,
Notary Public.

I, M. C. HALEY, County Clerk of the City and County of San Francisco, State of California, and ex-officio Clerk of the Superior Court in and for said City and County, hereby certify the foregoing to be a full, true and correct copy of the original Certificate of Copartnership of Samuel B. Connor and Andrew S. Grant, filed in my office on the 12th day of July, A. D. 1890.

Attest my hand and seal of said Court, this 20th day of April, A. D. 1893.

M. C. HALEY, Clerk.
By Wm. B. Lyman, Deputy Clerk.
[Seal of Superior Court.]

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated: General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulae Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water through Short Tubes and Compound Tubes; Flow of Water through Pipes; Tables of Velocities and Cubic Feet Flow for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend-Circular and Angular Flow through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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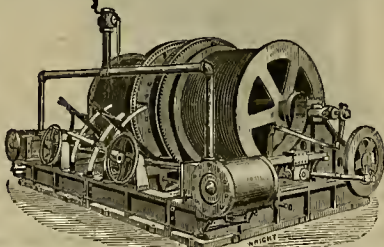
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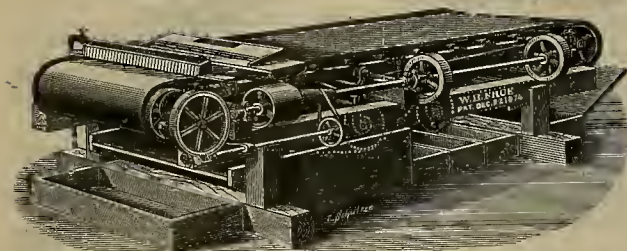
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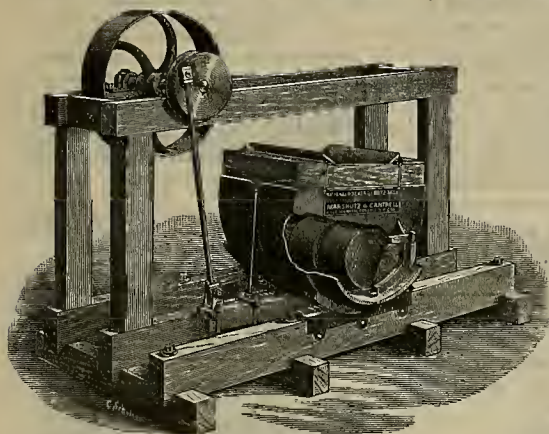
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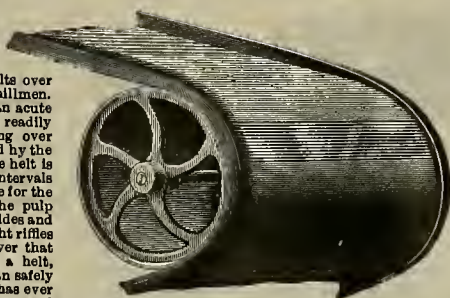
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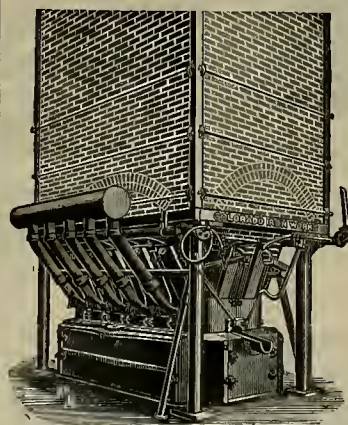
First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vibration and loss caused by the frequent breaking of the flange of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

VOLCANO.—Amador Record, May 11: We visited the Irma mine at Pioneer and found them taking out some good ore. The quartz is well loaded with sulphurets and sprinkled with visible gold. The ledge is about two feet thick. They have sunk on the ledge incline, which is about 71 degrees, pitching west. They are now running a crosscut and developing good ore. They will soon have backs enough to reap a rich harvest. They own about 1500 feet square of ground. Their facilities for working are good. Plenty of wood and water are at hand. About 23 men are now hired, but when ready to put out rock a larger force will be utilized. The Volcano Hydraulic Company has ground that will give the working of many years. Peck's claim, too, is extensive. He has about 31 acres, 20 of which are available for mining. About 15 acres are covered up with debris from rich hydraulic mines on the hills. The tailings are rich, from the fact that there was so much clay in the original bank which balled and picked up the gold in the flume out at the dump. Those mines were worked from '62 to '77. Much lost quicksilver is to be found. It was in those claims that diamonds were found. These immense beds of tailings have a body of lime which, if conveyed down Sutter creek in a flume, would make an admirable macadam road. Mr. Peck bought this property in '62. He owns an auriferous channel running up through the town, which must eventually be worked. He has two water rights and abundance of free water in the wet season. He needs, however, a monied partner to help him equip the claim with a new flume about 1300 feet long. His claim would then prove a veritable bonanza. The Robinson mine has suspended work.

KENNEDY.—Amador Record, May 11: It is now somewhere near six years since the Kennedy mine fell into the hands of its present owners and under the superintendency of J. F. Parks. The whole property was then in a very much demoralized condition, it having been sunk on to a depth of 850 feet and nothing found to really warrant further development. The present company secured a bond on the property for \$100,000 and immediately proceeded to sink another hundred feet. On the strength of the developments made on the new (950) level they concluded, with some misgivings as to the result, to buy the property. From that day to this the mine has steadily improved in output and appearance until it now ranks as one of the greatest gold mines in California. The latest development is the sinking of the north shaft 200 feet deeper from the 1550 level. On the 1750 level a drift and crosscut were run to tap the ledge. Where the vein is now opened up at that depth the showing is equal and probably better than anything thus far developed in the upper levels. This latest strike gives solid backs of virgin ground from the 1550 to the 1750 levels, which means sufficient ore for two years' run and probably an increased gold output over any like period in the mine's past history. Superintendent Parks was over from the Kennedy on Monday last and made a personal examination of the Wildman mine, in his capacity of resident director. Mr. Parks expressed himself as being greatly pleased with the recent developments made, and at the flattering outlook for the future of the property, and also with the good judgment displayed in its general management. Good reports reach us from Plymouth district. More prospecting and really active work are under headway in that section this spring than for several years previous. Plymouth has experienced some hard times for a few years back, but it looks as though her luck was about to turn into a good streak again. Superintendent Myers has put several men on at the Bunker Hill mine and it is understood that everything is being put in shape preparatory to starting up the mine in earnest. This will be hailed as welcome news by our country readers. A 60-horse-power engine and boilers have been purchased for the Bay State mine at Plymouth.

PROSPECTS.—Amador Ledger, May 12: The matter of finding a mine is, as a general proposition, a speculation which is attended with a degree of uncertainty as to results, and as the coveted gold is so anxiously sought, men and corporations are spending fabulous sums in an endeavor to find mines. In Jackson, within a stone's throw of this office, lies a piece of property of 80 acres which has had three prospect shafts about 50 feet deep, and a tunnel about 40 feet long, upon it for years, each having been made upon the several different ledges upon the property. When these works were constructed the decomposed quartz through which they ran proved to be very rich, while the ledge upon which they went down showed a good prospect. The property referred to is the Meek ranch which joins the Zeile property on the south, commencing about 500 feet from the Zeile shaft. It is bounded on the south by the Moore mine. The eastern side of it is 1500 feet long north and south, while the western side is 2200 feet long. The three ledges on the property extend north and south, just as do all of the "mother-lode" ledges. The tunnel to which we refer is just across the creek from the Zeile mill. This property is owned by Chas. Meek and Ellis Evans, and they ask but \$10,000 for the entire tract of 80 acres. Any one desiring to secure information relating to the purchase of this property, can apply to Ellis Evans at the National hotel, Jackson. The above is not the only property within a short distance of our town which is worthy of investigation by those who want to find a mine.

There are a vast number of similar prospects on the "mother lode," which would pay capitalists to investigate. Dave Fisher and N. Shea are delighted with their recent strike in the Irma. The Griesbach ledge which they have struck is about two feet in width and is very rich, being about the same quality as that found in the Zimmult mine near them. In addition to the Griesbach ledge they have struck another equally as rich. Negotiations are now in progress by the company looking toward the construction of a 10 stamp mill. The lessees of the Bunker Hill mine, near Amador, have begun work on that property, under the superintendency of John Myers. They are now busy at the Mayflower shaft, out of which they are taking the water and putting the hoisting machinery in readiness for steady work. The company expects to visit the property in a few days and make definite arrangements as to its future developments. J. H. Zumalt, who is mining in Pioneer district and hauling his rock to the James mill, had several tons of ore crushed last week which turned out about five ounces of gold to the ton. Mr. Zumalt is getting out the rock, hauling it to the mill and having it crushed at a total expense of \$4.50 per ton. At the Hardenberg, Supt. Fuller is continuing the sinking and is now down about 60 feet below the last level, as it was before Haywards took hold of the property.

Butte.

THE BISHOP MINE.—Oroville Mercury, May 13: By a fire yesterday afternoon at the Bishop mine, on the hline lead, near Bangor, the extensive hoisting works and arrastras on the property were totally destroyed. The fire originated from the smokestack, and when it was discovered it was beyond control. The Bishop was considered one of the best mines in that locality, and is the property of Mrs. Bishop and her sons, the Will brothers. On Sunday the pump broke down and it was repaired so that operations could commence again Thursday. The value of the works, including the machinery, is placed by W. W. Will at \$5000. Twenty men were thrown out of employment by the disaster. We understand that there was a partial insurance on the property. It is more than likely that the works will be immediately reconstructed.

THE ORO MINING COMPANY.—The directors of the Oro Mining Company yesterday let a contract to Wesley & Morgan, of Forestown, for development work on the ledge of the company situated near Enterprise. The contract calls for the running of a new tunnel 100 feet on a new lead and for the extension of the old tunnel 50 feet. The Oro is one of the best ledges in eastern Butte, and if the development work shows up the ledge as expected, a new mill will be erected and extensive operations inaugurated.

Calaveras.

GYPSUM MINE.—Calaveras Chronicle, May 13: E. H. Davidson of this place has located a gypsum deposit on Esperanza creek, about nine miles from this place. The lead is about 16 feet wide and can be readily traced for a distance of 5000 feet. Gypsum is a sulphate of lime and contains about 25 per cent of water, and when burnt to drive off the water and then ground up it forms what is known as plaster of Paris. There are a number of various colors, but that shown us by Mr. Davidson was snow white, fine-grained and translucent, and constitutes alabaster, or the finer grade of gypsum, and is used for making vases, mantel ornaments, etc. Mr. Davidson has a large specimen on exhibition at the postoffice in this place.

THE BEATRICE MINE.—Prospect, May 13: Work on this mine, on the San Domingo, is still continued, though at present the force is reduced and the mill is not running. The upper tunnel is being pushed, and rock is being taken out. Work will soon begin on the big tunnel which will be run on the vein the entire length of the three mines, or 4500 feet. This tunnel will develop not only this mine, but may be the means of opening up several more on the same group. The location is peculiarly favorable for tunnel development, owing to the steep mountain, and the tunnel will be nearly a thousand feet below the croppings. Abundant power is at hand for the power drills which will be used.

RICH QUARTZ.—Angels Echo, May 13: A man brought to our office the other day a piece of quartz, which would perhaps weigh three or four pounds, that was more than rich. It must have contained at least \$400. And the funny part of it is that the lucky finder would not show us the quartz until he had enjoined perfect secrecy upon us in regard to his identity and the location from whence it was taken. We shall, however, take the liberty of informing the public that the quartz was found in the Bear Mountain range.

Del Norte.

CHAOME.—Del Norte Record, May 13: It is rumored that the Altaville chrome mines will be opened this summer; if so, it will be a great help to Del Norte, as this will necessitate the employment of from 100 to 150 men. Seventy-five tons of machinery arrived by last steamer; also machinery for the black sand mines on Crescent City beach.

El Dorado.

PAOMIARO.—Georgetown Gazette, May 11: We are pleased to hear that the old pioneer miner, T. Z. Armstrong, is opening up a ledge southwest of town which shows good promise. It is about time Tom was making another strike, and if he doesn't, it will not be for lack of practical, well-applied energy. A. Baldwin arrived from Calistoga on Monday. Mr. Baldwin is the man who, a few years ago, with Tom Armstrong, took out a \$23,000 pocket below town. Our old friend is looking trim and hale as of yore, and we are inclined to believe he is up with a view to uncover another pocket.

Nevada.

WILL GET A GOOD MINE.—Transcript, May 9: The company that purchased the old Tom

Hughes gravel mine, and bonded the underground of the Morgan ranch, owned by the Nevada County Land and Improvement Association, are progressing finely. Dan Coffin is superintendent of the property and is confident of developing a No. 1 gravel claim. The channel is an extension of the one developed in the old Alta Hill, and extends through to the Town Talk ridge. The company have run their tunnel in about 900 feet from Deer creek on the opposite side and just below the Wyoming mine. They are employing a good force of men.

FINA NDOOTS.—Some very fine nuggets of gold were found in the Utah gravel mine, just above the Central House, a few days ago, and the mine looks better now than at any time since work was commenced upon it. There are four other companies at work in the vicinity of the Utah, and it is confidently believed that before the summer is over there will be a pretty good gravel-mining boom in that part of our county. There is no question about there being as good gravel mines in the Washington district as there are in the county, and time will demonstrate the fact.

WILL RESUME OPERATIONS.—Peter Long, superintendent of the San Jose drift gravel mine, arrived here from San Jose last evening. This morning he went to the mine and intends to begin operations at once. A crew of men will be put to work, and the development of the mine pushed ahead vigorously. Mr. Long informs us that the company is in good condition now and intends to do everything on a cash basis.

LOOKING FINA.—The West Harmony gravel mine continues to look fine. A contract has just been let to add five more stamps to the cement mill, making 15 in all. There is not much being said about this great mine, but the owners are mighty well pleased with their property.

SAVING FINE GOLD.—Grass Valley Telegraph, May 13: There is an apparatus in operation on Deer creek near Newtown that is reported to be most successful in saving fine gold. We do not nor could not learn the names of the inventors, but we are told that the system is a very simple one and consists of a series of sluice boxes peculiarly arranged. It is said that the two gentlemen who are working the arrangement have made \$100 in 11 days by just shoveling the sand, dirt or whatever may be handy into the flume. Where Chinamen, who are about as close workers in river beds, can only make \$1 per day, these parties, with their new process, make \$5 per day. Our informant says that the process is an entire success, and that the finest gold can be saved in any place. The parties operating on the creek are located near the Bagley place.

DEVELOPMENT.—Nevada Herald, May 12: At the Wyoming mine six men are working. They are taking out ore right along, and have quite a large dump of it. J. M. Buffington is superintendent. The Home people are prospecting their claim, just below the Providence. They have started a tunnel at the creek level, and will run into the hill about 150 feet and then crosscut both ways for the ledge. They are now in about 80 feet. There is a great deal of work going on at the Providence at present. The company are working both the front and back of their mine, and have large ore bodies. The mill has been put in shape, and is now running 30 stamps and 12 concentrators night and day. About 75 men are employed. The new chlorination works will soon be ready for business. The building and furnace are finished, and the tanks are now being put in. Superintendent Davis and F. W. Bost superintend the job, and the new furnace is pronounced a model one. The sulphurets-room is full, and Director Wideman thinks they will hardly be able to catch up with the output of the mine when they get to working the sulphurets. The Providence is still a big mine, and the prospects are that it will hold out for years to come. It is rumored that a company will resume work on the Pittsburg mine on the Town Talk ridge. The tributaries there have been doing remarkably well of late, and the owners feel encouraged to run a couple of new drifts in the lower levels. The Champion continues its steady output of bullion, and the surface improvements are nearing completion. The buildings cover lots of ground now. When all complete, work will be commenced on the plant for the old Merfield, it being the company's intention to operate both mines. The Champion will be a big mine then.

THAT OBEY THE LAW.—The few hydraulic mines which were running and impounding their debris, in this section, shut down promptly on May 1st, and are now awaiting, with the patience of Job, the coming of the Debris Commission.

THE MARYLAND.—The annual meeting of the Maryland Mining Company, Grass Valley, was held last evening, and the following officers were elected: Directors, Geo. D. McLean, Chas. H. Mitchell, T. C. Dorsey, L. V. Dorsey and S. P. Dorsey; president, S. P. Dorsey; superintendent, S. P. Dorsey; secretary and treasurer, L. V. Dorsey.

IDAHO-MARYLAND.—Telegraph, May 13: In an interview last week with Mr. Eugene C. Celler, superintendent of the Idaho mine, he informed us that they were now taking out most excellent ore from the lower depths of the mine in the Maryland ground. On Thursday they struck a fine ledge of gold-bearing quartz in the east drift of the 1400 level, and last evening there was a great strike in the 1500 level. The ledge in both places is large and is filled with gold. Many specimens were taken from both levels, and in fact the whole huge boulders of quartz taken from the ledge might be regarded as "specimen ore." The mine is indeed looking exceptionally well.

A DIVIDEND-PAYER.—Grass Valley Union, May 14: The W. Y. O. D., which is a dividend-

payer, is one of our best mines and a great help to the town. Quite a number of men are employed at good wages, and the mine is looking unusually good. A new condensing boiler, a new Corlies hoisting engine and a pumping engine have been purchased and will be put in use at the mine. No dividend was declared this month on account of the expensive improvements now under way, and the company has purchased some expensive property adjoining the mine. Mr. Dan Coffin is superintendent and is running things very satisfactorily.

IDAHO MINE.—This famous property, which has recently changed hands, still continues to bear as rich as ever. On Thursday they struck a fine ledge of quartz, bearing gold in large quantities, in the Maryland ground. Some rich rock was also struck in the 1500 level which is unusually good. The ledge is very large in both levels and a number of fine specimens have been extracted. Mr. Eugene Celler, the superintendent, understands his business and seems to know where the gold lies.

THE SOUTH IDAHO.—Some time ago we gave an extended account of this property, but since that time improvements have been made which are worthy of notice. A new steel whim was put up a short time ago and it works to perfection. The shaft is down to a depth of 55 feet, and they have a ledge which is two feet in width. The ledge shows free gold and is excellent looking rock. Eight men are employed all the time. No rock will be crushed for some time yet, as the company expects to erect a mill in a short time. Drifting will be commenced when they have gone to a depth of 100 feet.

OSEOEN HILL MINE.—Work at this mine is being pushed very actively, and it is destined to become one of the best mines in the district. During the short time in which they have been working the mine some extensive improvements have been made. The shaft is now down to a depth of 170 feet and the caved ground is almost all cleared, there being only two sets more to be taken away. Mr. Goldstone, superintendent of the property, informs us that this section will be the liveliest in the district in a short time. The buildings which have been erected are very heavy and substantial and are put up to stay. Very heavy machinery has been set on the works, and we will hear shortly of some very promising developments.

THE BALTIMORE.—This mine is situated on Squirrel creek, in Rough and Ready township, about 34 miles below town. They are running a tunnel, which is now 700 feet long. The ledge is about ten inches in width at present, but is expected to widen out before very long. A new mill will be erected as soon as the lumber can be brought from the mill, where it is being cut. Mr. Lakeman will have the iron work ready to put up as soon as it is needed. The mine is superintended by Joseph Snyder, and at the present time four men are employed. A raise has been made to tap the ledge, which will go right through to the surface. This shaft will be used as an air shaft. The mine, we are informed, can be run cheaper than most any mine around here, and for that reason an enormous amount of ore will not have to be taken out to pay expenses.

Placer.

THE MAYFLOWER BOSSING MACHINE.—Colfax Sentinel, May 13: A machine that will bring about a great saving in drift mining is at present in use at the Mayflower mine, Forest Hill. It is a boring machine consisting of a portable engine and boiler combined and a portable tower 40 feet high with gearing for the drill, which alone weighs 1100 pounds. The machine when working will bore a hole six inches in diameter and from 15 to 25 feet a day in mountain cement or in rock wet or dry. There is a pump eight feet long and five inches in diameter, the drills and this pump, working like an ordinary pump, fills with the sand and is then emptied. Whenever it is desired rocks the size of a hen's egg may be taken out, which increases its usefulness in prospecting. The machine enables the owners to prospect the pitch of the bedrock or channel, and works as well at 1200 as at 200. It has proved itself a success and will prove a great saver of energy and money in prospecting. It has been on the divide for about two months, and will continue to be used over there as it belongs to the Mayflower Co. It can be put up in two days and taken down in one and requires but two men to run it. At present it is run by a man from Pennsylvania who has had much experience in boring wells. It consumes but little fuel, and no doubt will aid materially in developing the mineral resources of the divide.

CLAIM JUMPED.—Herald, May 11: On Tuesday, May 9th, George J. Morgan relocated the old Floyd mine, known as the New Hope quartz mine. The ledge is situated in Township 12, Section 16, just at the rear of the jewelry shop of E. Lundquist, about a mile below Auburn, on Auburn ravine. Morgan has christened his mine "The Wilson." Early this week he took a couple of tons of ore to the Lavalle quartz mill, which does custom work, had it crushed and amalgamated, and claims to have realized \$32 from the rock. Some time ago Morgan offered the owners of the land \$500 for ten acres on which the ledge is located. His offer was refused. In an interview with W. H. Huchin last Thursday morning Morgan offered to pay \$100 per acre for two acres, but he wanted \$150. The readers of the Herald are familiar with the litigation which followed the location of the mine by E. P. Floyd in April, 1889, and also the recent decision from the Secretary of the Interior declaring the land owned by George Keener to be agricultural land. The case will probably be taken into the courts, but with the recent decision from the Department of the Interior it looks as though Morgan will have

the hard end of the battle. Attorney F. P. Tuttle represents Morgan and J. M. Finweller the Keeshners.

San Diego.

GOLD GALLOA.—Julian *Sentinel*, May 11: A couple of weeks since we made a note of 140 ounces of gold bullion making its way to San Diego. Last week Smith, Plant & Frary made a cleanup of over \$7000 for two months' work in the Ella mine, the property of S. N. Wilcox. The boys were working the mine on a lease. Little has been said of late regarding this property or the boys who were hammering away firm in faith of future reward, we preferring to let the results speak right out in meeting. This they have done in a manner very gratifying to those interested and to the further credit of the camp. We regret that the bullion was not placed on exhibition in San Diego as an evidence of what muscle and pluck will accomplish in the Julian mines. This ore ran \$120 per ton, but the extreme modesty of the boys knocked the camp out of a big advertisement. We again remark that had any other locality in this southern country produced a like amount of gold under similar circumstances, the newspaper columns would have been filled with it for weeks and scores of mining men would have been attracted to the camp thereby. We again remark that the gold is here, in quantities that will pay, and the judicious application of capital and muscle will bring it to the surface. Only to-day one of our leading merchants' borrowed our drug scales to weigh a lot of gold brought in by a chlorider. This is a fact, and proves conclusively that Julian mining interests are not dead but sleep only. There is not a month in the year but what this camp adds to the gold of the nation, and if Mr. Carlisle gets into trouble after he has put into circulation the "gold reserve," of which we hear so much of late, all he has to do is to call upon Julian and she will respond in a manner that will paralyze the Wall-street shysters. If one-half the energy and capital of San Diego county that is being wasted in the vain effort to accomplish the impossible was concentrated in the development of our known resources the result would be surprising, but it is a shameful fact that not one dollar of San Diego capital can be enlisted in her home enterprises. How can her people expect capital to come from other quarters to develop her water enterprises or her mineral resources when home capital is lying idle, too timid to leave the bank vaults?

Shasta.

IRON MOUNTAIN.—Shasta *Courier*, May 13: A report was circulated this week that Iron Mountain was going to start up, but, as we anticipated, the report was too good to be true. We understand, though, that the owners intend to make some improvements up there, among them being a large dust chamber, which will save and retain the rich and valuable dust that used to escape in working the ore. Wm. Chynoweth has secured another lease on the Golden Chariot near Ft. Dingee, and is doing some work on the property. This mine belonged to Wm. T. Coleman, who secured a U. S. patent to the claim and did considerable work on it before he met with financial reverses. We expect to be able to record some lively operations in mining properties in this vicinity within the next few weeks. Mill Davis and George Slocum have been repairing and putting the Spring creek ditch in order. The ditch supplies water for the Calumet, which, according to reports, will resume operations soon. C. G. Farmer sold to A. Lievsay the Rob Roy and Comet claims near Rock creek, about a mile north of town. The claims have not been worked to any great extent, but show flattering prospects, and the ledge, which is from one to two feet wide, promises to develop into a young honauza.

Siskiyou.

GOLD MINING.—Yreka *Journal*, May 10: The gold mining claim at Greenhorn, in which Messrs. Raynes and Austin are interested, is now progressing nicely. They are working a large force of men opening up the claim. It is now paying more than expenses, which speaks well for it. We hope this claim will develop into a good paying property, as it gives employment to a number of men, and those who are risking their money should be amply rewarded. We consider the mining interests of this county of great and lasting interest to the county. Gold taken from beneath the earth and put in circulation is so much permanent wealth added. E. H. Hughes and others are interested in the development of quartz ledges in Greenhorn. They have several ledges that prospect well, and they expect to put a number of men to work soon. San Francisco parties are looking into these claims with a view of purchasing. Siskiyou county has millions of gold buried in her hills and valleys and only awaits development. The American Bar Co. of Portland, Or., which is putting in a wing dam in the Klamath river, a few miles below Henley, will soon be ready for operations. It has put in a 50-foot wheel, and has pumps and everything ready for work. The Hunt mine on Middle Fork, Humboldt district, has a shaft down 150 feet, and is running a crosscut 12 feet from the bottom. It employs 18 men, and is running day and night. It has a ten-inch ledge that prospects exceedingly well. Clark & Co., near the same place, are running a tunnel, and are developing a fine ledge that pays \$18 to \$20. John Boyle of North Fork, Humboldt, has a tunnel in 600 feet, and will run it at least 700 feet farther, and will strike the ledge at a depth of 600 or 700 feet. He is much bothered with snow, which is four or five feet deep yet. He has leased the Spencer mine, and will put on a force of men at once. The shaft is now down 300 feet, and he will continue sinking the shaft, and expects to strike a good-paying ledge. The mine has shown a fine paying section. Messrs. Phillips and Cartwright, of the North Fork, are getting out timber, preparatory to stopping out the

quartz, which shows a splendid prospect. Hegler Bros., of the same district, have opened a fine quartz ledge in their tunnel, and are taking out a large quantity of quartz, preparatory to crushing in their splendid mill. Jessemann & Humphry, of the same district, are working the lower tunnel, stopping out the ore, which will undoubtedly yield well. Mr. Foure, of the Knapp mine, is working on his lower tunnel, and is opening up a well-defined ledge, which will pay \$12 to \$15 per ton.

Trinity.

GRAVEL CLAIMS.—Cor. Trinity *Journal*, May 13: Six miles below R. L. Thomas' place, on lower New River, I reached Steve Noble's home place. Mr. Noble has 66 acres here, 30 of which is good paying gravel. It has never been washed except in a small way. He also owns the water-right of Panther creek, from which, he informs me, a ditch of one and a half miles would bring the water to the claim at 250 feet of pressure for eight months in the year. There is a good dump right into the river. The banks are from 20 to 40 feet high and the gold heavy. He estimates that an expenditure of \$4000 will put the claim in good running order. A little below Noble's house, and on the opposite side of the river, is the Mason Bar claim, owned and worked by W. J. Nichols. This property is located at the mouth of China creek. He estimates that about two or three seasons' run will about work this claim out. Two ditches of three-fourths and one mile in length bring the water of China creek to the claim with a pressure of 120 feet. There are about 1000 feet of 9, 11 and 15-inch pipe. The flume is 80 feet long, with a 12-foot undercurrent. There is a splendid dump into the river. The creek furnishes about 700 inches of water for four months of the year. The banks are from 10 to 60 feet in height, the best pay being of course near the headrock, but the gravel prospects from grass roots down. He estimates that it pays from 12 to 15 cents per cubic yard, the gold bringing \$17.67 per ounce from the mill. The gold is rather coarse, pieces of \$9, \$11 and \$14 having been found in cleaning up. When he has washed this claim out, he proposes to remove to another claim which he owns at China Bar, about half a mile below his present work, which prospects still better than the Mason Bar claim. The same water which he is now using will be taken there. This water covers about 109 acres of good pay gravel. One mile below Noble's place is the Hoboken postoffice at Mosee Patterson's. Mr. Patterson has been here many years. He owns the Granite Slide claim of 20 acres on the west bank of New river, and about six and a half miles above its mouth. There is not more than a quarter of an acre washed. The banks of gravel, so far as they have been washed, are from 15 to 25 feet high, and, I am informed, prospects well. The ditch is 2 1/2 miles long and brings the water from Bell's creek. The water is good for about six months of the year, and can be brought to the claim with as much as a thousand feet of pressure if such a great pressure is necessary. Pieces of gold as high as \$3 in value have been found here. Mr. Patterson also owns the Hoboken Flat mine of 36 acres. This is located about a mile farther down the river, and is said to prospect well. Between Panther creek and Hoboken, a distance of two miles, there are about 300 acres of gold-bearing gravel, which, if a company should purchase the claims and water-rights of Messrs. Noble, Patterson & Nichols, could be covered and controlled by the only water to be obtained. These rights and mining claims should by all means be consolidated and washed by one company. They could be purchased for small sums, and would not require the expenditure of many thousand dollars to place them all in good working order should a company take hold. They could also purchase R. L. Thomas' claims and water-rights at Portuguese Flat, six miles above Noble's (mentioned in my letter last week). They would thus control the water and gravel of New River from its mouth up for a distance of 12 miles. This would be an excellent opportunity for the investment of capital.

IRON QUAATZ.—Trinity *Journal*, May 6: We were shown some very rich quartz this week by Ezra Thomas of Shasta county, who has been in this county for several weeks prospecting. The quartz was from a ledge about 2 1/2 feet wide, which Mr. Thomas discovered recently in the Lower Trinity country. Mr. Thomas is a prospector of 20 years experience, and says that there are lots of good mines in this county which in time will be worked with big profit.

BEAUTIFUL GOLD.—Another cleanup was made at the Hubbard mine the first of this week which was more than satisfactory. From a 20-days run about \$6000 was taken from the flume, giving \$300 per day with a very light expense. This mine is only one of many in this county, as will be thoroughly shown when water in sufficient quantity is brought on to the ground. Lack of water has caused many rich locations to lie idle and undeveloped, but the time will come, and soon, too, when such ground will be worked so as to yield a handsome profit.

Tuolumne.

BONDEN for \$6000.—Tuolumne *Independent*, May 13: The Columbus quartz mine, owned by Smith Bros., at Cherokee, has been bonded to Wm. Johns for \$6000. Mr. Johns represents a wealthy English company, which means active business. They have a bond for one year, and the work of development has already commenced. An engine has been put on the mine this week, and it will be in running order by to-day. The shaft is now down 92 feet, and will be put down 100 feet deeper before drifting. The hanging-wall vein is six feet wide, and the foot-wall vein is ten feet in width. The pitch of both will bring them together at a greater depth. For years this mine has been worked at a profit by arrastre. With a width of vein from which to readily extract large quantities of ore, mill-working will yield a large

revenue over the slow arrastre process. This has always been considered a valuable mine, and we feel satisfied that Mr. Johns (who, by the way, knows much about Tuolumne's old mines, from his long mining experience here) has made a wise selection in developing the Columbus.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, May 13: 1500 level.—Have continued to extract ore and old fillings in working upward in the old south stope, from the 10th to the 16th floors, above the sill floor of this level. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level. We continue to extract some ore from the old stope, eight floors up in the upraise, No. 6 carried up from the main north-west drift; also from the old stope in working north from the crosscut run west from the north-west drift. A south drift started at the end of the crosscut run east from a point 60 feet up in the upraise which was started from the drift from these north workings, 27 feet above the sill floor of this level, has been advanced 50 feet in porphyry and some quartz. Have continued to extract some ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main north-west drift. Have extracted during the week from all parts of the mine 511 cars of ore about 500 tons. Shipped to Morgan mill 656 1440-2000 tons of ore. Average assay value, per railroad car samples, \$26.95. The assay value per battery sample of all the ore worked at that mill during the week (655 tons), was \$24.08 per ton. Bullion now on hand in our assay office, value about \$12,000.

OPHIR.—1565 level.—The west crosscut started from the bottom of the winze, sunk 52 feet below the sill floor of this level, has been advanced 28 feet; total length, 68 feet; in a porphyry, clay and quartz formation. The men heretofore employed in repairing the west drift from the Ophir shaft on the 500 level have been engaged during the past week in making necessary repairs in the shaft, it being joint work with the Mexican Company.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 23 feet; total length, 219 feet, continuing in porphyry formation carrying clay separations. The men heretofore employed in repairing the west drift from the Ophir shaft on the 500 level have been engaged during the past week in making necessary repairs in the shaft, it being joint work with the Ophir Company.

UTAH.—340 level.—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 15 feet; total length, 151 feet; in quartzite and clay formation of very low assay value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 11 feet, making the total length 337 feet; the face is in hard porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 17 feet, making the total distance west of the joint shaft 3173 feet; the face is in porphyry and stringers of quartz.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 17 feet, making the total distance west of the shaft 3173 feet; the face is in porphyry and seams of soft clay.

ANDES.—On 420 level west crosscut from east crosscut No. 1 north, has been advanced 10 feet. Total length, 35 feet; formation in face is hard porphyry with small seams of quartz.

GOULD & CUAAY.—200 level.—During the past week west crosscut No. 5, started in north-west drift, 432 feet from main west drift, has been advanced 11 feet; total length, 471 feet; face in hard porphyry. Suro tunnel level.—Connection has been made between our winze from the 1600 level and the joint north drift from Suro tunnel. We are now getting ready to make some needed repairs to this drift.

BEET & BALCHAA.—200 level.—At a point in north-west drift, 230 feet from our south line, started west crosscut No. 2 and advanced same 20 feet, passing through porphyry and quartz; total length, 80 feet. 900 level.—West crosscut No. 4, started in south-west drift 112 feet from west crosscut No. 3, has been extended 18 feet; total length, 46 feet; face in soft porphyry. Suro tunnel level.—Connection has been made between the joint north drift and the Gould & Curry winze, which was carried down by them from the 1600 level. This gives us a good ventilation for this part of the mine. We are now getting ready to do some necessary repairing to this drift.

HALL & NOACROSE.—1800 level.—Are working in the upraise in west crosscut on our south boundary. This upraise has been carried up 24 feet, the top continuing in quartz. 1300 level.—We have retimbered the shaft and station a distance of 15 feet east of the shaft. We are now retimbering the shaft above the 1300 level. Main incline.—We continue making repairs where necessary.

CHOLLA.—Are repairing north drift, 850 level. The east crosscut near the south line, 930 level, is out 200 feet; face is in soft porphyry and seams of clay.

PORCOT.—The north drift from east crosscut, 850 level, is out 54 feet; face is in porphyry and clay. The south raise 80 feet south of Potosi winze, 930 level, is up 74 feet; formation in the top is porphyry and streaks of low grade quartz. The north and south drifts 200 feet east of Potosi winze, 930 level, have been connected. North raise, 1000 level, is up 75 feet on the stope; formation porphyry and low-grade quartz. South raise, 1000 level, 20 feet south of

top of raise from 1100 level is up 28 feet; top shows six feet of fair-grade ore. The east crosscut 1000 level, 160 feet north of top of raise from 1100 level, is out 21 feet; face is in hard porphyry.

Silver King District.

HIGH GAAR.—Pioche *Record*, May 11: Geo. Jones, of Silver King district, has ready for shipment a considerable quantity of very high-grade silver ore. Is black sulphurets and is exceedingly rich. Silver King produces such ore frequently, a fact which causes its backers to stay with the district, and the result must be that the mother lode of that section must sooner or later be found. William Wheatley was in from Silver King district yesterday and returned this morning. He reports progress on the smelter there as somewhat slow, but that it is equally sure. The smelter stack is up, and several retaining walls and grade are prepared for the engine which, however, is not yet on the ground. It will be two months yet, at least, before a start will be made.

Bristol District.

CORPAA FURNACE.—Pioche *Record*, May 11: Charley Roe started up his copper furnace at Bristol Tuesday evening, and in the first 12 hours' run had 10 fine bars of copper bullion. Everything is going smoothly and the run will be highly profitable. Coal is hauled from the P. C. smelter at Pioche. Some custom ore will be worked also before the run closes. The claims from which this copper ore comes were located originally for silver only, but appear to have changed in character, and what the result of extensive work would be, whether to open up more extensive copper deposits or to revert to thin silver seams, is hard to determine.

Cedar District.

RIOR.—Silver *State*, May 13: Charley Harvey is in from Cedar district, about 20 miles due west from Humboldt house. This is a district of which very little has been said, though it is one of the richest in the county. A silver mine must necessarily be very rich to pay its owners to ship ore from it with the white metal quoted at 33 1/2 cents per ounce, yet that is what Charley Harvey and his partner, Jack Poole, are now doing and have been doing for some time. Their ore nets them from \$125 to \$150 per ton, and carries as high as 60 per cent lead, this latter paying all the expenses of shipping and reduction, amounting to nearly \$50 per ton. They make their shipments to the Selby works at Vallejo Junction. L. A. Blakeslee also owns a mine in the district, from which he has just had 20 tons of ore taken out for shipment.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MAY 9, 1893.

- 497,229.—MORDANT—E. Boursier, Los Angeles, Cal.
- 497,166.—AUTOMATIC GAIP OPANEA—W. P. Courtney, Oakland, Cal.
- 497,234.—TILA CONSTRUCTION FOR WALLS, ETC.—J. A. Flint, S. F.
- 497,124.—CULTIVATOR—C. Hohson, Watsonville, Cal.
- 497,125.—STOVEPIPE SHELF—C. N. Johnsou, Seattle, Wash.
- 497,195.—WATAA MOTOR—J. W. McCoy, Berkeley, Cal.
- 496,888.—SELF-OILING JOBANAL BEARING—A. Morrison, Los Angeles, Cal.
- 497,199.—APPARATUS FOR STEMMING RAISING—E. Niehoff, Tacoma, Wash.
- 497,249.—APPARATUS FOR RAISING SUNKEN SHIPS, ETC.—E. Niehoff, Tacoma, Wash.
- 497,209.—WOOD-SAWING MACHINE—D. M. Prosser, Reno, Nev.
- 497,129.—ELASTOPLATING APPARATUS—A. R. Reams, Elmira, Cal.
- 497,031.—GATE—A. Rickert, Clements, Cal.
- 497,077.—FASTENING FOR JAR COVERS—H. Schammel, S. F.
- 497,064.—SPECULUM—M. E. Van Meter, S. F.
- 496,923.—FRAM ESCAPE—Watgren & Haglund, Seattle, Wash.
- 22,410.—DASIGN FOR BADOA—C. A. Gay, Seattle, Wash.
- 22,408.—DASIGN FOR SPOON—W. S. O'Brien, S. F.

The following brief list by telegraph, for May 16, will appear more complete on receipt of mail advices:

California—George W. Arper, Oakland, fancet for oil cans; Mark S. Brndick, Alameda, feed apparatus; Edward L. Burgers, Los Angeles, trap for basins, baths, etc.; Gustav H. Carlson, San Francisco, spillage basket and basket hamper; William A. Bobbe, Alameda, fruit-plting machine; George H. Johnson, Sisson, railway snow-banger; William P. Miller, Redding, ore separator; James E. Phelps, San Francisco, parlor game; Charles W. Prentiss, San Francisco, shirt; Percy W. Ross, Los Angeles, refrigerator car.

Oregon—Campbell E. Christman, The Dalles, fruit-drier; Charles Harmon and A. McRae, Milton, cultivator; Nathan L. Baber, Corvallis, amalgamator; Tice S. Riddle, Eugene, wagon-roed; Greese Riggs, deceased, Crowley S. Briggs, executor, Bu; Thomas G. Sortor, Baker City, filter.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

ANY man fitted to take the general superintendency of a foundry and machine shop will do well to read the advertisements in this week's MINING AND SCIENTIFIC PRESS.

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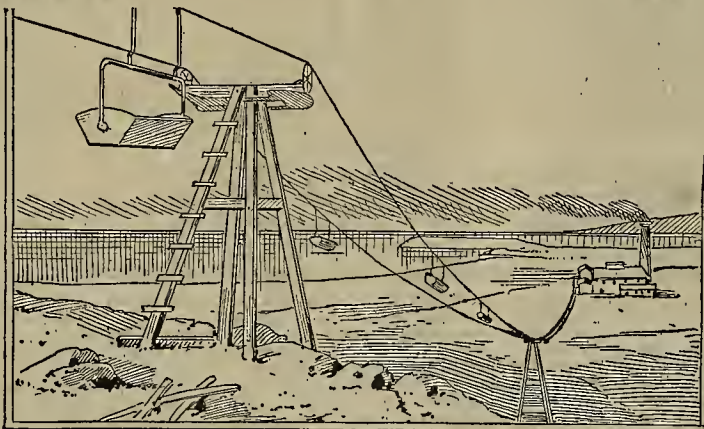
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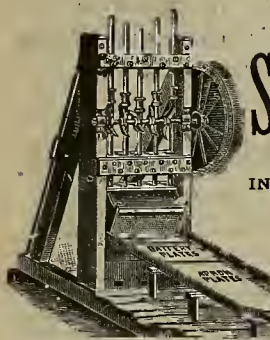
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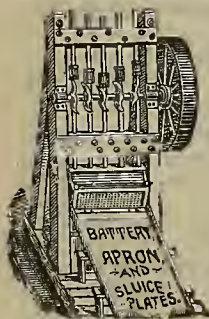
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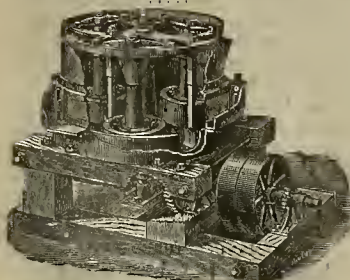
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VOL. LXVI. — Number 21.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 27, 1893.

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SINGLE COPIES, 10 CENTS.

The Johnston Concentrator.

This new concentrator is the invention of George Johnston, who, as far back as July 9, 1867, patented a revolving belt concentrator "with raised edges and a shaking or rocking motion from side to side." This new machine, lately patented, is claimed to be the most satisfactory one yet evolved from the many types previously in use. The belt frame is suspended from four non-parallel hangers placed in a frame, and by regulating their angle, the oscillation necessary to keep the sides of the belt from being overloaded with sands is obtained, while the oscillation is not sufficient to overload the belt in the center as is the case with the rocker. The result of this motion is a perfect concentrating surface the entire width of the belt.

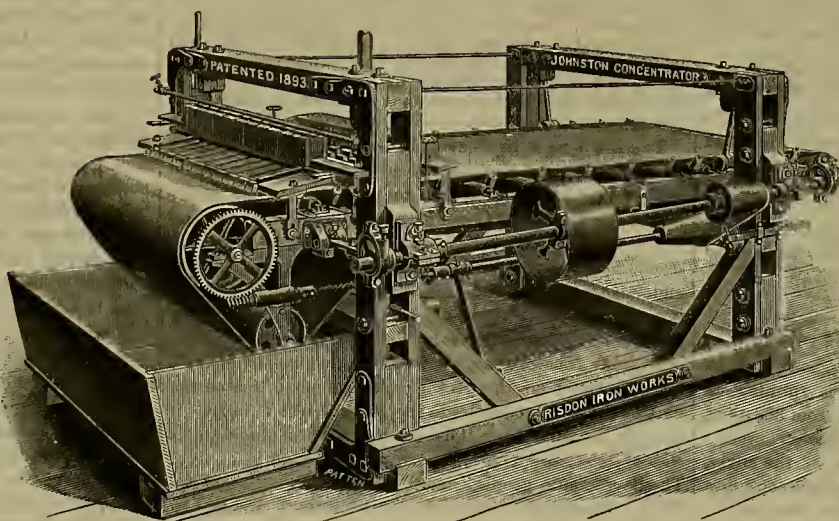
Small rollers at an angle of about 45 degrees, stand on a slotted base, screwed to the top of the belt frame, keeping up the sides of the belt to prevent overflow. If the belt shifts to either side it can be followed up by these rollers, and answers all the purposes of moulded edges.

The pulp box discharges the pulp in narrow channels four or five inches apart in the direction of the belt's travel, leaving spaces on the belt where the sulphurets can remain undisturbed by the fall of water or sand and pass up to the clear water at the head of the belt; the sand at the same time passing down unobstructed. This machine requires very little attention, is easily regulated, and will do the work of five stamps. With canvas belt it is sold for \$400, but if rubber belt is required it will be furnished at the increased cost.

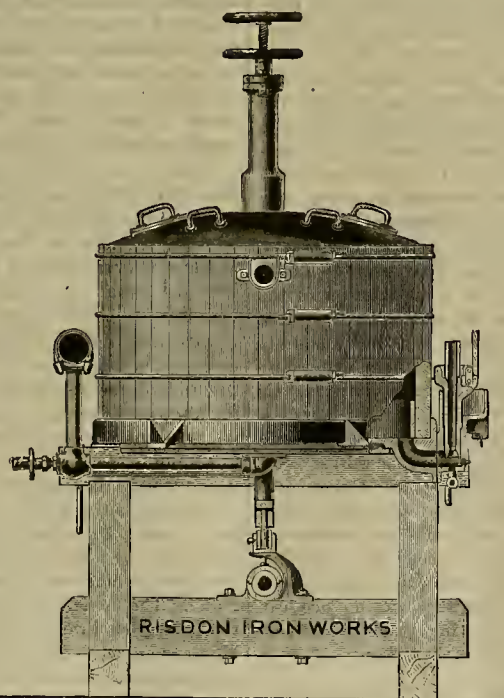
Mr. Chas. A. Reed, superintendent of the St. Lawrence mine, Ophir, Placer county, is using one of these concentrators behind a 3½-foot Huntington mill. He says: "The sulphurets are very clean, and the loss in the tailings is insignificant—only a few coarse cubes and flakes, but no fine sulphurets. There has been no trouble in adjusting the belt, which frequently runs for more than a shift without adjustment." Superintendent J. L. Grimes of the Drummond mine, Forest Hill, Placer Co., says that "the rocker motion of the Johnston concentrator immediately settles the sulphurets to the canvas belt, which retains them with any amalgam that may pass the plates; it leaves the sulphurets very clean and retains all the fine ores." Mr. Grimes recommends the machine very highly. This concentrator is manufactured in this city by the Risdon Iron Works.

The Standard Amalgamating Pan.

The Standard amalgamating pan, as illustrated in the accompanying plates, embodies all the latest improvements of value now being used in continuous mills. The



THE JOHNSTON CONCENTRATOR.



THE STANDARD AMALGAMATING PAN.

are provided with a steam chamber in the bottom and cones, which affords an increased heating surface, making it possible to furnish the required heat with exhaust steam, which is always used with economy when available. The admission and discharge steam valves are so connected as to create a current through the steam chamber which can be regulated as desired. These pans, as constructed by the Risdon Iron Works, are built somewhat heavier than the five-foot combination pan, and are provided with a wearing ring of cast iron to protect the inside of the staves at the bottom of the pan, as shown; and also with a cast-

iron sleeve to protect the cone as shown. The pan spindle is supported by a bracket cast on the horizontal driving-shaft box, and permits of the removal of the shaft without disturbing the spindle.

A section of the front of pan shows the quicksilver howl with pan siphon in position for draining the pan of quicksilver and pulp, when requiring repairs. These pans are designed with a view to strength and durability. All parts subjected to special wear are protected as thoroughly as possible. Diameter, inside, 5 feet 2 inches. Weight, approximately, 8500 pounds.

THE SEVEN STARS MINING CO.
When the Seven Stars Mining Co. of Arizona was organized, the stock was "guaranteed" for five years by H. H. Warner of Rochester, N. Y.—that is, he guaranteed dividends and the mine was bought and the mill put up. Now it turns out that Mr. Warner has failed, so the guarantee will amount to nothing. The mine must now depend on its own resources, and the investors depend on the mine rather than the man. The mine has not failed that we have heard of, and may turn out better than the man did. However, the mine has been well equipped with machinery, etc., and ought to be able to stand alone. Mr. Warner doubtless had faith in it or he would not have given any guarantee to stockholders, and it is to be hoped there was good basis for his opinion. The investors were mainly Eastern people, unfamiliar with mines, and we should regret to see them lose anything by their venture even if the "hacker" of the enterprise has failed in his own business.

THE TOWNSITE CO. at Kaslo, B. C., have completed arrangements for the erection of sampling works at that point. The capacity contemplated is 100 tons daily. The idea is to furnish a means whereby the owners of small claims can secure quick returns on their

shipments, as an advance of 75 per cent will be made on all ores consigned as soon as the work of sampling is completed. This will make it possible to keep running on comparatively small capital claims which could not await returns from distant smelters.

THE situation in the Kansas coal fields is unchanged. President Walker is preparing to issue a general order calling every union miner in the State out next Monday, and fixing Monday, a week, as time for the Missouri miners to quit.

MINING AND SCIENTIFIC PRESS.

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Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, May 27, 1893.

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Comment.

The cyanide process seems to be doing good work in Nevada. At Tuscarora the cyanide plant is running on tailings from the Union mill. The returns from 368 tons, show conclusively that the MacArthur-Forrest process does extract the gold and a large percentage of the silver; assays from the tailings after passing through the solution showing only a trace of gold. Bullion to the amount of \$5,495 20 was melted from the product, a certain amount remaining in the zinc boxes, which cannot be obtained until an entire cleanup is made. The capacity of the plant is being increased by the addition of two ore tanks, one solution tank and a couple of zinc boxes which will be put in this month, after which the yield will be much greater. Says the *Mason Valley Tidings*: "The cyanide process, which is the method adopted for treating the gold tailings at Silver Peak, in Esmeralda county, is doing excellent work there. From a private letter we learn that 90 per cent of the assay value of the tailings was saved at the last cleanup. This is certainly encouraging." There are certain places where the process has not shown satisfactory results because too much was expected of it, or the men in charge did not understand it. Where intelligently handled with suitable ore, it seems to have given satisfaction. Experiments are being made in Calaveras county, this State, which may result in the adoption of this process. Dr. Schiedel, of New Zealand, who has made a success of the process in working sulphurets, has been up at Angels, in the interest of Alvinza Hayward, to see whether it can be satisfactorily used there.

We recently mentioned the fact that the Anti-Debris Association was enjoining many small hydraulic claims in Nevada, Sierra and Plumas counties, and stated that when the Government Commission is organized a license to mine may be procured readily in most of these cases and then operations may be resumed without reference to the Anti-Debris Association. Manager Phipps, of that Association, replies to that article in the *Marysville Democrat*, and among other things says: "The intimation that the Caminetti Debris Commissioners will grant permission to large mine-owners to operate in a way which will be injurious to us or that will discriminate against the small mine-owner is to attribute to that body a degree of official dishonesty and neglect which is unwarranted by the personnel of that Commission."

If Manager Phipps will pay us the compliment of quoting us correctly we will be obliged. There was no such intimation. We were speaking of small mines only, and only of such mines as can build restraining works. The writer happens to know the gentlemen of the Commission personally, and knows that neither Manager Phipps nor any one else can pull any wool over their eyes.

They will be conservative, fair, honest and just. Therefore we have hope for the miners' cause. But Manager Phipps simply uses this quoted sentence to carry a little favor with the Commission incidentally, and really to ask the valley people to continue to support the Association and keep him in employment. He again reasserts the old foolishness about the property of the valley being worth more than all the hydraulic mines. Yet the Government Commission which reported on the subject says the mining property involved is estimated at over \$100,000,000, while the land injured is less than \$3,000,000 in value. We did not say, either, as he asserts, that the large mines were being overlooked by the Anti-Debris spies, but that they were being put in order for work under the law. We still maintain that when the Debris Commission is organized and ready to issue licenses, Manager Phipps will be without an occupation.

R. T. Devlin, attorney for the Anti-Debris people, is informed by some of the Sacramento merchants that in some sections of the hydraulic mining regions orders have been issued by mine-owners that if the local storekeepers buy goods in Sacramento the mines will withdraw trade from them and force their employees to do the same. This is said to be on account of the recent organized opposition on the part of the valley counties to illegal hydraulic mining. The Sacramento Supervisors say that, in consequence, they have been approached by a few Sacramento merchants with the request that Sacramento take no further active part in protecting the Sacramento from injury, as such action on her part is likely to interfere with the sale of goods by the merchants referred to. It is hardly likely, in the *Bee's* opinion, that the leading spirits in the State Miners' Association would countenance the boycott against any one, and particularly against a community that, while manfully protecting its property and its rights, has shown the fair disposition towards such mining operations as would not injure or destroy it, as has Sacramento.—*Sacramento Bee*.

The *Bee* is right in one thing and wrong in another. The State Miners' Association has nothing whatever to do with this. The matter was brought up by one miner before the Executive Committee of the Miners' Association some time since, but was not even considered, no second being given to the motion. It was thought that endorsement of any such action would be undignified and improper, to say the least. So the *Bee* is right as far as the Association is concerned. But the attempt to withdraw trade from Sacramento to which that paper refers, is not on account of the recent organized opposition on the part of the valley counties to illegal hydraulic mining. If there is any such thing it is on the part of individuals who object to the opposition to legal hydraulic mining. The Sacramento people tried to kill the Ford bill and the Debris Commission bill in the legislature and, when passed, asked the Governor to veto them. Both were in line with the Congressional law recently passed, and in line with recent court decisions. Then, when the delegates to the Trans-Mississippi Congress met in San Francisco, a prominent Sacramento merchant was the only one who opposed the resolution about hydraulic mining and asking Congress to build dams to preserve the streams. These various actions seemed to some miners to indicate that Sacramento men were opposed to their mining even under the Caminetti law. If it had been only opposition to illegal mining the miners objected to, they might have stopped trading at Sacramento years ago if they wished. If there is any boycott now, as the *Bee* says, it is not general, is entirely on the part of individuals, and not with the advice or sanction or approbation of the State Association. We are free to confess, however, that we have heard several gravel miners say they would not trade in Sacramento because the people there evinced no disposition to give them a chance to make a living at their business even when they could do it legally. There is now a way to mine legally by hydraulic method, and only one way, and that is to build restraining works. Just now it cannot be done at all because the Government Commission is not yet organized. But the miners should be given a chance to build the works and obtain the licenses. If they fail to do this when they can, why then punishment will follow. If the Sacramento people take a hand in punishing those who break the law, no one can blame them, but those who are trying to do the decent thing should be given a chance to make a living.

News has reached Ruby, Wash., of a marvelously rich strike in the Grand Summit mine on Palmer mountain, in the Okanogan country. They have out 60 tons of ore, the value of which per ton is stated by the telegraph, but it runs up so high into the hundreds of thousands that we are afraid to mention it in a mining paper. The gold is figured by the pound, and such things usually fizzle so quickly that we prefer to chronicle a strike of \$20 rock. People unused to gold mining are apt to get greatly excited at a few pounds of exceptionally rich rock. In California, which has always led the other States of the Union in gold production, and has more gold mines than all the rest put together, if the specimens are very rich we put the mine down as a "pocket claim," that is, a mine

with occasional bunches of very rich rock, and a good deal that is valueless. Some of these mines, notably those in Tuolumne county, pay well, but none pay like those where they have a good wide ledge which shows no gold at all, but will mill ten or fifteen or twenty dollars a ton. These latter are the kind of mines we want in this State, and the only trouble is that most mines will not make as good a showing as that.

A Federation of Miners.

For five days last week delegates from the miners' unions of Montana, Utah, Idaho, Nevada, South Dakota and Colorado have been in session in Butte City. The purpose of the meeting was to organize a Western Federation of Miners, which was harmoniously accomplished. Nearly 50,000 miners are represented in this federation, and it now takes rank as one of the strongest labor organizations in the country. John W. Gilligan of Butte was elected president; T. Manlin of Butte, secretary, and John McLeod of South Dakota, chairman of the executive board. The federation adopted resolutions urging free silver coinage; opposing imported contract labor; opposing repeal of the Sherman Silver Purchase Act and the importation of armed forces in cases of strikes; appealing to workmen not to join State militia organizations; demanding the restoration of the mineral lands in the mining States to the people; condemning the Russian extradition treaty; approving the Supreme Court ruling in the Geary Exclusion Act and demanding an enforcement of the law; and demanding the election of United States Senators by direct vote of the people.

There is considerable "scatter" in the scope of these resolutions. It might have been better for the miners to stick to a few things directly connected with their line of business, without touching anything else. It is a big contract, for instance, to enforce the demand for the restoration of mineral lands to the people. The railroads have been getting hold of these by wholesale for years. The question is the most important one the miners of the West have to deal with. If the miners of all the mining States will pull together, something may be accomplished, but it will be a big job and take a long time.

The question of freight rates on ores is another important matter for all mining communities, but this does not appear to have been touched upon. Modern methods develop great reduction centers, and to get the ores from the mines to these points is a subject in which every miner is interested. Even large properties, with heavy capital, cannot be successfully operated unless freight rates are reasonable. We have an example of this in the case of the Cœur d'Alene mines, Idaho, where they had to shut down and discharge their miners, because they could not pay the railroad rates demanded. If a big mine cannot be worked under such conditions, how can small ones with no capital? And there are two or three hundred small mines to one big one. The subject was well worthy of consideration by a miners' federation.

It is to be noticed that Oregon, California, Arizona and New Mexico were not represented at this convention. In this State there are no miners' unions, but we have had no labor troubles in the mines for a great many years. The miners average about \$3 per day. In Montana, Nevada and some other places they get \$1 more, but how long this will continue remains to be seen.

In Nevada, during the palmy mining days, there was no objection to a \$4 rate, but many claims cannot pay this under present conditions. This rate, combined with the low price of silver, has closed quite a large number of mines in the sagebrush State. The miners are naturally unwilling to see it reduced and the mine-owners have not cared to make a contest, so they have closed down.

We have had no \$4 a day rate in California for a great many years. However, living is cheap here, and with few exceptions the mines can be worked all the year round, conditions which are different from those in the other States. The probability is that some time in the future the underground work will be graded as to pay in Nevada, Montana and elsewhere, and those who work above will get less than those in the lower levels. The high rate of wages at Cœur d'Alene had something to do with the shut-down there as well as railroad rates, though the companies said little about it, not caring to have a labor contest.

The Western Federation of Miners, now that it is organized, will in the future have more or less to say about wages of miners; in fact, that is doubtless its main feature. But if silver continues depressed and silver camps are to be worked, the Federation will have to consider a reduction within the next few years. We are not advocating this, but stating the probability. Mine-owners will not work their claims unless they can see some profit in the business, and with mines closed there is no work for miners at any price.

The Top-Heavy System of Mining.

The mining company which has salaried presidents, superintendents, secretaries, clerks, etc., in the proportion of about ten to one actual miner employed, may be said to be doing business on the top-heavy system. For stock-jobbing operations the system will answer for a time, but not for legitimate mining. It is the adoption of this system, which has brought the Comstock mines to their present condition, and unless it is changed they will go out of sight altogether. There are mines up there which have not produced a pound of ore for years, but which have continually kept a large corps of salaried officials to run them. Of course, this kind of a mine needs very few practical miners, so very few are employed.

There is one company which is said to be paying \$970 per month for rent, secretary, president, superintendent, office boy and janitor, which has never spent any of its assessment money in exploring the ground owned by it, and employs no miners at all.

Another mine with a president and secretary at \$150 each per month, superintendent, foreman, accountant, timekeeper, watchman and shift boss, pays \$930 a month to them and \$208 to two miners. Another pays \$624 to miners and \$2000 a month to officers who are supposed to keep them at work. One of the big mines pays nine miners \$936 a month, while its other salaries consume \$2581 per month. Still another expends \$52 a month for its miners and \$242 per month to take care of them. One pay-roll shows \$52 a month for a miner and \$942 for the bosses. Then there is another with \$624 worth of miners a month and \$1449 worth of other officials. There is also a company which expends \$52 per month for miners and \$813 to keep them in order. Another with three miners, costing \$208 per month, employs supernumeraries costing \$1297 per month. This last mentioned mine has collected over \$1,000,000 in assessments, but has no mine to speak of, never paid a dividend and never will.

It is no wonder that miners are leaving the Comstock, because there is little work for them. The money derived from assessments seems to go mainly to maintain a horde of useless officials who do nothing particularly toward mining development. For development actual miners are needed, yet comparatively few are employed. Of course there must be some, but they are getting fewer and fewer. But the useless officials do not seem to let go. They still hold their positions and draw their salaries.

Meantime, Comstock mining interests are on the decline. Shares which used to be worth dollars are now worth only cents. The top-heavy system will ruin this or any other business. In fact, no other kind of business would have stood it half as long as this has, for, though it has been going on for years, it is still kept up.

If a sudden and radical change in the whole plan could be made, it would do more good to Comstock interests than the striking of another old-time bonanza. Many of these mines could doubtless be made to pay if conducted on any sort of decent business basis, but never can under existing conditions. Some mines on the great lode have made magnificent records as bullion-producers and dividend-payers, while others have made infamous records as robbers of innocent investors and stockholders. The latter have always been run on the top-heavy system, and this alone should be sufficient to condemn them and those persons who manage them. The system is an imposition on the investors and stockholders and a detriment to the whole mining industry.

Foundry Notes.

THE Vulcan Iron Works are furnishing stamp mills and other machinery for the Jones mine in Shasta county, also considerable machinery for the leaching mill of the Ontario Silver Mining Company of Utah, as per designs of Messrs. Salkeld & Behr, engineers. Although Eastern competition and unfavorable conditions have operated to deprive San Francisco manufacturers of considerable trade in the mining machinery line that formerly came to this city from Colorado, Utah, Idaho and other distant points, the general reputation and excellence of their work in this line has enabled them to hold a portion of this trade.

THE Union Iron Works are building a fine steel yacht for Timothy Hopkins of this city, to be called *El Primero*—the first steel yacht built on this coast. The hull is now ready for the boilers and engines, which will be placed in position next week. It is the intention to have the yacht ready to go to sea when she is launched. The *El Primero* is built for speed and it is expected that 15 miles an hour will be made on the trial trip. The vessel is to be fitted with a Roberts water-tubed boiler and will stand a steam pressure of about 200 pounds to the square inch. The engines are to be high speed, triple expansion, capable of turning the propeller 300 revolutions. The hull is entirely of steel, the plates being five-eighths of an inch. The main deck of Oregon cedar is flush from stem to stern, the pilot-house, captain's room and smoking parlor being the only upper works. Below the main deck, abaft the engine-room, are the cabins and staterooms. There are accommo-

dations for eight persons in berths and several more on the divans in the cabin. The inside finishing of the cabins and staterooms will be in polished hardwoods, handsomely paneled. The stateroom of Mr. Hopkins and the one opposite will be fitted with wide double berths and stationary washstands. Two other staterooms with two berths in each are abaft the main cabin. A bathroom and other conveniences are close at hand. The upholstery will be in velvet. The galley and range are amidships. The accommodations for the crew are forward. The yacht will carry a crew of eight men. Incandescent electric lights will be placed throughout the vessel and a search-light at the bow.

THE Risdon Iron works have recently commenced the construction of the Johnston concentrator, which is illustrated on the first page of the PRESS this week.

Coast Industrial Notes.

THE exports of lumber from San Francisco for the first four months of the year were 4,697,000 feet, against 9,959,000 feet for the same period of 1892.

THE city of Alameda is considering the proposition of putting up a salt-water plant for street-sprinkling purposes, and plans are being prepared. The estimate of cost is \$54,000.

THE San Jose Supervisors have decided to deepen and straighten Guadalupe creek, from the northern city limits to tide water, in order to prevent overflows of adjacent lands.

AT the special city election held at Auburn recently the proposition to bond the city in the sum of \$20,000 for the purpose of providing a system of sewerage was carried almost unanimously.

THERE are now 14 vessels in the harbor under charter for grain, 11 being British and 3 German. The tonnage of the above vessels is 23,098 tons and the carrying capacity about 36,900 tons.

THE Pacific Coast Steamship Company's steamers after June 1st will drop San Pedro from their ports of call under a new arrangement with the Southern Pacific, whereby they are to call at Santa Monica.

THE machinery at the Green creek end of the electric line for the Standard mine at Bodie has been put in, and in a few days the whole power plant will be completed. Meantime they are hard at work retimbering the Standard shaft.

THE imports of sugar at this port by sea during April, 1893, were 52,586,990 pounds, against 39,565,315 for same month in 1892. The total imports from Jan. 1st to April 30th were 164,769,812 pounds, against 114,931,758 in 1892 for same period.

OWING to drafts in the Comstock mines, the miners are leaving for Butte, Mont., Park City, Utah, Vanderbilt, Cal., and Kootenai, B. C., which seem to be the most attractive camps just now. A good many of these men have worked on the Comstock for years.

SURVEYOR McTARNAHAN has been looking over the ground on the Stanislaus river, above the People's Ferry, with a view to the establishment of an electric plant. Angels is not to be behind her sister cities, and it is only a question of time before it will be supplied with electricity.

THE Orange county Chamber of Commerce in a meeting gave its pledge to raise \$1500 to secure a title to land in trust for Hill & Co., of Keokuk, Ia., on which to erect a vinegar and pickle factory, the plant to cost not less than \$5000. The deed to the land is not to be delivered till the factory shall have been in operation 12 months.

THE Register reports that Lukes & Wagner, owners of the flour mill recently consumed by fire at Ball's Ferry, talk of erecting a mill at Cottonwood, Shasta county, running it by electric power from a dynamo which will in turn be run by the Battle creek water power. If they do this, it is stated that they will furnish Cottonwood and Anderson with electric light.

THE contract for the laying of the foundation for the new ferry depot has been signed by the Harbor Commissioners. The San Francisco Bridge Company, which is to perform the work, gave a bond for \$180,000, with Behrend Joost, John F. Kennedy and D. A. Warren as sureties. Although the contract is now complete, it will be at least two months before the contractors can begin operations.

OVER three hundred men are now employed in the railroad yards at West Oakland. The ordinary number had to be reinforced in order to keep up with the great increase of business. The yards are blocked with cars and the "hosing down" process has to be kept up constantly. Four overland trains leave daily—two in the morning and two in the afternoon. The proposition to light through cars with gas—the latest innovation in Eastern Pullmans—will probably be taken up sooner than was expected.

SCARCELY a day passes without the formation of some new enterprise for the irrigation of large bodies of land in this State or Arizona. Not only do these enterprises cover vast areas of land so arid that no valuable product can be obtained without the aid of water, but in many cases it is proposed to irrigate lands whose chief boast in the past has been that they did not require that aid in order to be profitably cultivated. The latest enterprise of this character has its location in Butte county, where it is proposed to divert the water of the Feather river, by way of the Big Bend tunnel, and spread it over a large area of land, which will be made highly productive through its agency.

In its current issue, the *Pacific Wine and Spirit Review* says: "After the largest shipping season in the history of the wine business of California, the dullness of summer has come, and the trade of the next two months will be quiet, as is usual in the early and mid-summer. Nearly all the shippers have finished with their orders, and light exports will be the rule from now on. The exports of wine for April were very heavy, particularly by rail, the

grand total being 7885 cases and 1,223,964 gallons, which makes it, with the exception of March, the largest shipping month for bulk goods in the history of the trade. The rail exports are widely distributed and indicate the advantage of low freight rates."

THE danger of an extensive and protracted snit has been averted by a transaction closed in Boise, Idaho, by which the DeLamar Co. becomes the sole owner of the famous Stoddard mining claim. O. M. Hays received \$35,000 for his three-fifths interest last year, and now Tim Regan gets \$87,500 for his two-fifths.

ANOTHER irrigation and water-storage enterprise is being surveyed on the Gila, 12 miles above Yuma, by George Norton. The proposition is to put a 60-foot dam on the river where it is crossed by a natural bridge. The river has a fall of only three feet a mile, and it will consequently back the water 20 miles. The canal will run east of Yuma and into Mexico.

THE City Trustees of Alameda have adopted a resolution that will call for plans for the construction of a city hall in Alameda in accordance with the proposition already passed upon. It provides for the construction of a public building at a cost of \$50,000. As an incentive to architects it is proposed to give to the author of the best plans the work of supervising the construction at five per cent of the entire amount, the second best plans \$250 and the third \$150. The plans will be considered early in July.

THE plans for the new bath-house of the Olympic Salt Water Company have been accepted. The house will cost between \$70,000 and \$80,000. It will front on Bush street for 220 feet and will be 150 feet deep. The tank, which will be its principal feature, will be 150 feet long and 70 feet wide. Its deepest part will have 12 feet of water, and this will shoal gradually to 2 feet. Around the tank will be 200 dressing-rooms. It was reported at the annual meeting of the company that six miles of pipe were being laid. The foundation for the pumping station at the beach is finished, the pumps are ready to be put in place, and work on the excavation for the reservoir is progressing rapidly. The service from the ocean to the Olympic Club will be in operation within 90 days.

A DISPATCH from Astoria dated May 20th says: "Advices from various places on the Columbia give the general condition of the salmon-packing industry. These and the local reports are unfavorable, and create great fears as to the success of this season's business. The rough weather, the freshets and the immense quantities of drift render fishing almost impossible. The damage to nets and traps continues. The traps are catching nothing. Many up-river canneries are not packing at all. The fish-wheels at The Dalles and elsewhere are taking no fish. The canneries connected therewith, which packed 500 cases a day last year, are idle. All things considered, the outlook is discouraging. Should there be no change for the better soon, the pack for the season up to June 1st may be 40,000 cases short compared with last year's output."

AT Pine Ridge, Fresno county, the snow has not yet all gone, but many men have gone into the timber region. The Bonanza mill will be in operation in about ten days. It is the largest mill on Pine Ridge. Bennett, Sage & Humphreys are putting in a mill with a capacity of 25,000 feet a day. The mill will start in two weeks. Demorris is also pushing to completion his mill on the south side of Pine Ridge. It will be in operation in a short time, and its capacity is rated at 25,000 feet a day. S. Lehman has taken to the mountains two 40-horse power boilers for his mill, which is situated near Markwood Meadows. The principal machinery was made by Bond in Fresno. The mill combines a box factory with its lumber saws. The flume men are at work repairing the broken places in the flume, and work will soon begin on the Stevenson creek dam. Ed Figgins, who has the contract of hauling for the Bonanza mill, has a half mile of his log chute completed. J. E. Bretz is arranging to start his shingle mill at an early day. Musick's and Cumming's mills are preparing to start as usual.

Personal.

THE Governor has appointed W. P. Mathews of Tehama World's Fair Commissioner for California, vice John Daggett, resigned.

W. O. RALSTON, Secretary of the State Miners' Association, and James J. O'Brien, the gravel miner, have been up in Plumas county looking at some properties there.

DR. A. SCHEDEL of Auckland, New Zealand, is stopping in Angels, Calaveras county, inspecting the various methods of working the mines and treating the ores.

GOVERNOR MARKHAM has reappointed the old Board of Trustees of the State Mining Bureau, as follows: J. Z. Davis, W. S. Keyes, J. E. Doolittle, W. S. Lyle and Thomas Bishop.

W. R. ECKART, engineer of the Comstock pumping committee, has been on the Comstock for several days past gathering the last data for his report on the feasibility of draining the lower levels of the great lode.

ERNEST WILITE, mining engineer, formerly of Grass Valley, has accepted an engagement with Barnato Bros. as manager of one of their properties in Johannesburg, South Africa. Mr. Wilite sailed for the Cape on the steamship Spartan, April 29th.

JOHN HAYS HAMMOND, the well-known mining engineer, who has been in London, is on his way home from Chicago. It is said here that Mr. Hammond went to Europe to sell the Harqua Hala mines, Arizona. He will shortly go from here to South Africa on some business connected with the Johannesburg gold mines.

CHARLES A. LILLIE and family took their departure from Angels for Shingle Springs, El Dorado county, last Monday morning, where Mr. Lillie will be employed as foreman of the mine recently purchased by Hayward & Lane. Mr. Lillie was for several years underground boss at the Utica mine.

Tuolumne County Mining Interests.

From Our Regular Correspondent.

TO THE EDITOR:—Tuolumne county's past record is familiar to the readers of the PRESS. In this record she has distinguished herself by producing a great many very large "pockets." In consequence of these frequent strikes by the pocket miners, the county has come to be known as "a pocket county." While Tuolumne is the banner pocket county of the State, having in the well-known Bonanza mine at Sonora a property that has produced over \$3,000,000, one mass realizing over \$125,000, the fact should not be lost sight of that she has also a large number of milling veins. These have been equally profitable with the pocket ledges, and the total output greater; but, owing to the fact that their yield was regular and well-known, no mention has been made of their product. To-day, as in the past, the miners delve and hope in the well-known pocket sections, and every month records the strike of the more fortunate pocket miners. While the county is benefited by every miner so employed, it is the present activity along the milling ledges that causes every one to feel that a new era is about to dawn, and Tuolumne's mineral wealth to receive the development required to show her real wealth of gold. In the past, short shafts were sunk on the various ledges, and sums ranging from \$500 to \$100,000 extracted, and the work stopped. At present a class of men have taken hold of these old veins who believe that where so much rich rock was found good milling rock exists, and they have no intention of running away from a good, healthy, old-time pocket. So far their work has proven their surmises correct, and one success has led to the trial of another practically abandoned ledge, until the quartz-mining interests of the county look more promising than at any time in the county's history. Quartz, however, does not hold a monopoly, as the extensive marble quarries near Columbia are now in the hands of a company that is securing the recognition for this unexcelled marble that it should have received long ago. It is well known that Tuolumne has been rich in placer mines, but it is not so generally known that she holds within her borders to-day continuous, unbroken river channels capped with basaltic lava that has scarcely been prospected. On the main channel a large corporation has begun operations on an extensive scale, which must in time attract capital to this vast field of profitable mining investment, and once Tuolumne's quartz ledges, ancient gold-bearing river channels and marble quarries are fully developed and in operation, old Tuolumne will surprise the skeptics who cry, "Pocket county."

COLUMBIA MARBLE WORKS.—Bannister & Fearfield are proprietors of these quarries, which are situated about three miles north of Columbia, on the eastern slope of the Stanislaus river, and about 1000 feet above the same. The supply extends throughout and beyond the 140 acres of the property, and is inexhaustible. At this time three quarries are open on the property. The south quarry is of a very fine-grained black marble; the center of a grained marble; while the north is snow-white Carrara marble.

In consequence of the three varieties and the excellence of the marble, the quarries can fill an order for any variety and in any quantity desired. The quarry is equipped with complete works, which at this time is filling an order for 6000 12x24 inch tiles for the City Hall of San Francisco. These tiles come from the "veined marble quarry." It is to be regretted that the tiles are not from all three quarries, thus showing the variety and fine quality of the marbles. This marble belt is very extensive, extending not alone through Tuolumne, but across the river and almost across Calaveras county. So common and so plentiful is the stone that in this section the rancher and the miner's porkers "point with pride" to the fact that they and their ancestors "dwell in marble halls."

HAM & BIRNEY.—This property, just up the river from Columbia, is fast being developed by that energetic rustler, Mr. W. Sharwood, for Mr. Leachman. At present a Huntington mill is in operation and a full gang of miners employed in the development of the mine.

THE NOONDAY is being pumped out and will be developed by parties who have secured a bond on the mine. The mine is about 11 miles north of Columbia, between the middle and north forks of the Stanislaus river. The old 175 foot shaft showed an 18-inch vein of very rich dark-blue ribbon quartz, and is on the same belt as the Sheep Ranch mine of Calaveras Co. Crossing from Calaveras is an old lava-ash capped river channel that broke away at Columbia and made that camp rich in placer gold and then extended on, unbroken, to Soulsbyville and beyond. Some day this old channel will have its bedrock opened and will well repay the fortunate owners.

SONORA.—Owing to litigation over the principal mines of the town, business has been exceedingly dull for months past, but at present the mines are resuming, and it is earnestly hoped that there may be no further shut-downs.

THE GOLDEN GATE. E. C. Loftus, superintendent, has held the belt and banner as the mine of the county. Just now, Capt. Nevills looks wise, says nothing, but seems to say, "Just wait till the Rawhide gets her stamps to dropping." It won't hurt the Golden Gate to have a successful rival, as the recent litigation has brought out the fact that the Golden Gate, with her 10-stamp mill, chlorinating works and water-power system, has a shaft down 460 feet, with a level run 700 feet on a continuous shoot with an average vein of eight feet of \$16 a ton quartz. Naturally, there has been some contention over so choice a plum and the end is not yet. The mine was shut down (enjoined) from September 22nd to April 15th, but is now dropping its stamps with old-time regularity under a receiver. The question in dispute, "Can a corporation be a co-partnership?" will soon be decided by the Supreme Court, and all Sonora trusts that in the future the mill may run steadily, be it co-partner or corporation.

THE SAN GISEPPA, too, has had to "bide a wee" while the claimants fought it out in court, but at present it looks as though the differences would be reconciled.

THE BONANZA, D. R. Oliver, superintendent, is out of

bonanza at this time. Mr. Oliver is retimbering the old workings and prospecting the grounds to the west, and incidentally taking out gold from the old stopes.

SOULSBYVILLE.—The old Soulsby awaits the coming of some one that will reopen the mine and prospect the 2200 feet of undeveloped ground contained in the property. The past history of the mine is such that there can be little doubt of the success of the work, while the results, if at all equal to the Soulsby's past record, would be most gratifying. Mr. W. Sharwood is the owner. The Blatt & Gilson mill is being removed to the Keltz mine "over on the river," of which Mr. Sharwood is superintendent. The Keltz is well known, and with the Blatt & Gilson mill added to its equipment, will rank as one of the leading mines of the county.

THE BLACK OAK, W. P. Scott, superintendent, is now down about 560 feet, with a strong ledge heavily mineralized. The 10-stamp mill is dropping steadily, with most flattering prospects in store for the owners.

CHEROKEE DISTRICT is midway between Soulsbyville and Summerville. Capital is being attracted to this section with its high-grade propositions, and the region will now be given a waking up.

Wm. Johns, the well-known expert of Plumas-Eureka fame, has bought for himself the Mastodon mine and is erecting a hoist. When men like Mr. Johns select Cherokee as a field for the investment of their individual funds, it is the best possible recommendation the section could have, especially when the investor is as conservative as Mr. Johns is known to be.

THE CARLOTTA, Sutton & Symons, owners, is in litigation, with a decision in sight. The vein is not large, but its contents more than offset that, and once litigation is out of the way and the mine equipped the Carlotta will be heard from.

THE PORTO FINO, W. Sharwood, owner, is one of those "nice little mines" that we would all like to own. The shaft is down 100 feet, with a level run 92 feet, all in one, that averages \$35 per ton. Mr. Sharwood expects to get water for power onto the mine soon, when he will proceed to make a record.

NORTH STAR AND LAURA.—D. R. Oliver is owner of these mines, which are north of and on the same vein as the Dead Horse. Mr. Oliver expects to give these mines a thorough development this season, and as they have the Dead Horse vein running north and south through the entire length of the property, with the Carlotta, Pennsylvania and Porto Fino crossing at almost a right angle, he feels very confident of showing up a very fine property.

THE DEAD HORSE, W. Thomas superintendent, keeps up a very lively kicking, and while all about it are "mum as an oyster," it is generally known that the mine has been and is to-day one of the oldest and best mines in the county. A number of mines in this neighborhood have recently been bonded, and this season will see them developed. Just above Summerville Capt. Nevills has bought the New Albany and is now having the water system put in shape for active work on the mine.

SUTTERTOWN.—Jackass Hill is being given the usual attention by the pocket hunters. At present several companies of Soora capitalists and mine operators are trying their luck at pocket mining on the hill with the usual luck. The pocket miners may not always strike it at Tuttletown, but the traveling man always does, for at this place a sacrifice is offered up morning, noon and night of deliciously-fried chickens with all the trimmings, differing from other hostilities in this: that here they try to see how much they can get in instead of out of you. The natural result is the present increase in the dimensions of the restaurant, while the traveler cries, "Long live Tuttletown."

JAMESTOWN.—There is very little doing in this vicinity. The Columbia Gold Mining Co. and a San Jose company are drifting under Table Mountain and are said to be doing very well. There is a long stretch on the mother lode in this section that will some day come to the front.

QUARTZ MOUNTAIN.—The App, C. A. Nevills manager, was down 750 feet when she hung up her stamps. Capt. Nevills is now down 350 feet in the old shaft and is fast crowding to the bottom. The work so far shows a 16-foot vein of \$10 quartz. If anybody can tell why they hung up their stamps with that to draw on the Captain would like to know it. The mine has fallen into good hands and will soon be showing that all Quartz Mountain mines have needed was capital, grit and brains. The App parallels the old Heslep, which no doubt could be again worked to a profit with present improvements.

THE DUTCH.—The Heslep and App both join the Dutch on the south, so that it contains both veins, which evidently join near the center of the property. The mine has a 200-foot shaft and hoist on a 16-foot vein that mills \$8 per ton. There are numerous readers running to the main vein which are very rich and keep the Owens (Fitzgerald Bros.) busy mortaring rock.

THE HOLMES & MILLER, E. A. Stent, Supt., is south of the App, and, like all Quartz Mountain ledges, is on the mother lode. Mr. Stent is cleaning out the old shafts to see what frightened the former owners away. The north shaft yielded ore that averaged \$126 a ton, the center 30-foot shaft produced \$30,000, while the south shaft returned \$100,000 from but 90 feet in depth. It seems almost incredible that no more work was done, but such was the fact until Mr. Stent took hold. That he will get a mine is a foregone conclusion. A few years ago Angels, of Calaveras county, was like Quartz Mountain—called "only a pocket camp," but a shaft or two has proven it one of the best camps in the State, and it is but a question of very short time until these mother-lode mines of Tuolumne will show that good pockets don't hurt good mines.

RAWHIDE MINE, Capt. C. A. Nevills, manager, has now two shafts, each down 300 feet, with a fine 40-stamp mill ready to operate this month. Just as I came to the shaft the miners came up for dinner, and each brought up a piece of quartz showing gold very freely set in the solid white quartz. In the past the Rawhide was noted for her very rich ore; in the future it is Capt. Nevills' intention evidently to give her a reputation for a large bullion output. The

hoist and mill came on to the mine at the same time, and the captain showed his caliber by taking his time to the mill and crowding the mine. This has not pleased everybody, but the result shows sufficient ore in sight to keep the stamps dropping steadily once they are let go. The plant on the Rawhide is one of the best in the State, and I doubt if the mill can be excelled anywhere.

MARTHA WASHINGTON PLACER MINING CO.—The mines of this company are located on Peoria Flat, about five miles northwest of Chinese Camp. The company is composed entirely of Oakland ladies, who have here secured 700 acres of ariferous gravel ground, 520 acres of which is pay. At this time they are operating by hydraulic process, and have a 75-foot bank of gravel panning gold from the grass roots to bedrock. The gold is bright, amalgamates very freely, and that on the bedrock is coarse. The company has secured a Bennett placer-mining amalgamator, which they will operate in addition. The ground being free of all cement, clay or heavy boulders makes it especially adapted to this or any other process. In addition to this large area of free-wash gravel, a tunnel 1100 feet long has been driven to tap the old Table Mountain channel, where it crosses this property, and bedrock struck showing gravel that goes \$19.50 an ounce. The situation of the mine is complete. Water has been secured for the entire year at very reasonable rates. The pressure is over 280 feet; natural restraining dams are in place and the climate admits of working every day in the year. It is one of those favored mines where "Every prospect pleases and only man is vile," and as the property is managed entirely by the lady owners, every prospect should please in the Lady Washington. It is not possible to do justice to this promising enterprise in this necessarily limited notice and the writer will endeavor to give a more detailed and satisfactory description in the near future. E. H. SCHAEFLE.

Copper River Placers, Alaska.

There is likely to be a big rush of miners to Alaska this season, and if reports are true the Copper River country is about to blossom out as the richest and most prominent gold district in the entire Northwest.

Private advices are to the effect that last fall a party of prospectors, who had been exploring on Copper river all the season with no very great success, had at last struck rich placer diggings about 200 miles up the river and had camped at the spot for the winter.

Before they were forced to quit work, however, they discovered that the entire section of country about them was very rich in gold-bearing quartz and managed to locate several fine ledges. The placer diggings, however, are, so the advices state, the biggest thing of the kind on record.

The entire district seems to be composed of rotten quartz and from \$1 to \$5 a pan can be obtained anywhere. It was late in the season when the diggings were discovered and the party had less than a month to work in, but during that time over \$20,000 was washed out by seven men.

Fraok Wilson, the leader of the party, will come down to Vancouver as soon as possible, and will charter a schooner and send her up with machinery and supplies, while the rest of the party will do the best they can with the means at hand until he returns.

Mr. Wilson will also take up enough lumber to build comfortable quarters for the men, and expects to have a small mill in position and running before the season is over. There is plenty of timber and lots of game, so that there is no danger of starvation, and the river is expected to furnish power to not only run the mills, but also to operate the sluices.

Copper river is not nearly so far north or so difficult to reach as the Yukon, and freight can be carried to the new gold fields for less than half what it costs to the gold camps on the Yukon. Besides this, the season is much longer and the terrible cold and heavy snows that the miners on the Yukon have to contend with are unknown in the Copper River country.

So far no news has been received from the camps along the Yukon this season, but as there were many men there who had very little in the way of food and other supplies to carry them through the winter those who have friends there are anxiously awaiting to hear from them, as it is feared that some will have a hard time to hold out until the season opens up.—Examiner.

MINERAL IS REAL ESTATE.—In a trial before Chief Justice Gooding of Arizona, at Yuma, a jury acquitted two men who had been indicted for stealing ore recently from the Bonanza mine. The defendants had been caught on the premises with the ore in their dinner pails. Lawyer Pierce Evans maintained that no crime had been committed. In the first place, he said real estate cannot be stolen. Gold ore is real estate until broken with the ledge in which it is found. His clients, he insisted, didn't carry the gold away, as it was seized in the Bonanza shaft house. Bonanza miners had been in the habit of taking away ore in their buckets as specimens. For all that appeared to the contrary, the defendants in the present cases might be lugging off gold ore worth \$5 per pound simply as "specimens."

A. MALTMAN will shortly erect below Watt Park, Grass Valley township, one of the most complete reduction works ever put up in Nevada county. The new works will have a capacity of eight tons of sulphurets in 24 hours, and will be equipped with the best and most improved apparatus and machinery, including an improved sampler. Contracts have been made with most of the mines around Grass Valley to work their sulphurets as soon as the new works are ready.

The survey for the San Diego and Phoenix road has now reached into the Otay country. A letter from a Los Angeles contractor contains an offer to grade, bridge and lay the track from San Diego to Yuma under contract, and take one-fifth of his pay in bonds of the company.

The So-called "Sap" of Trees and Its Movements.

An address by CHARLES E. BARNES, Professor of Botany, University of Wisconsin, delivered before the State Horticultural Society of Wisconsin.

The subject which I have chosen to present to you this evening is not chosen so much on account of the information which I am able to impart as for the purpose of correcting a great deal of misinformation which is widely prevalent. Many false ideas as to the nature and movements of what is popularly known as the sap of trees are extant, and in a large number of cases these ideas are founded upon mistaken notions of the physiology of plants. Our own knowledge about many of these matters is yet exceedingly imperfect, and it is for that reason that many of my statements will of necessity be negative. The subject also is one which must have considerable interest for those who are so intimately engaged in cultivating fruit and shade trees as are the members of this society; and I take it that no fact in regard to the life and mode of working of the plants with which we are so constantly dealing will be entirely without interest.

WHAT IS MEANT BY "SAP?"

It will be necessary for us at the outset to gain some accurate idea, if possible, of what is meant by the word "sap." If we think for a moment of its various uses, we shall see that it is a word which designates not a fluid of definite composition, but one under which is included a great variety of watery solutions. The sugar-maker begins even before the snows have left the ground to collect from wounds in the trunk of the maple trees a sweetish liquid which he calls "sap." After a considerable time the proportion of sugar which this liquid contains diminishes very greatly, and he then abandons his work because, as he says, the "sap" has become too poor. The man who has postponed pruning his grape-vines or trees too late in the season finds that from the cut surfaces a watery substance is trickling which he calls "sap." But the sugar-maker will be unable to obtain either sugar or syrup from this fluid, which is, however, called by the same name as that from which he manufactures his sweets. When a boy who is making a whistle hammers the bark of the twig in the spring, he finds it easy to separate the bark, because, as he says, the surface of the wood is then slippery with "sap." The sap of the hoy is widely different from the sap of the pruner and the sap of the sugar-maker.

Again, what we do not call sap may furnish us with some illustrations of the diversity of meanings of this term. We do not ordinarily speak of the "sap" of the apple, or of the "sap" of the grape, or of the "sap" of the orange, but call the fluids which these fruits contain "juice." And yet they are not more different to their composition from those fluids which we do call sap than the three examples already mentioned are different from each other. We might, therefore, in all reason, apply this word sap to the juices of fruits.

We popularly distinguish the older hard internal wood of the tree under the name of "heart wood" from the younger, softer and lighter-colored external wood, which we call the "sap wood." To the fluids which saturate the sap wood we are constantly in the habit of applying the word "sap," but I have never heard it applied to the exactly similar fluids which saturate the heart wood. As far as the composition of these fluids is concerned, there is no reason why that in the heart wood should not equally well be designated as sap.

What then are we to understand by the word "sap?" Evidently not a substance of any definite composition; but the word signifies only in the most general way the various watery fluids which are found in the plant. There is no reason indeed why these solutions should not be called *water*, for in many cases they are almost as pure as the water which we drink. In the chemist's sense, the water which we draw from our wells is a watery solution of various substances, and yet we do not designate it commonly by any other term than simply "water." In a similar manner, it is quite proper for us, and perhaps it would conduce to clearness of ideas, to designate the watery solutions in plants simply by the term "water," understanding it in its popular and not in its strictly chemical sense.

MOVEMENTS OF WATER IN TREES.

Let us turn now to the consideration of the movements which the water in trees exhibits. I shall confine my remarks to trees simply for the reason that they present the greatest variety of water movement and at the same time furnish the greatest difficulties in the explanation of these movements. If, therefore, we understand the movement of water in trees, we shall be able readily to transfer these ideas to the movement of water in the smaller plants, although the statements applicable to the trees are not always applicable to the smaller plants, because of their greater simplicity; however, the greater includes the less.

THE EVAPORATION STREAM.

In the first place, there is need of a very considerable amount of water to supply the constant evaporation which is going on from the leaves of trees. Immense areas of delicate tissue are exposed to the dry air, and oftentimes to the hot sun, in the form of foliage, and from this foliage there is going off at such times large quantities of water in the form of vapor. The water needed to supply this evaporation must come from the soil, because it is not possible for the leaves to take in any water, not even when they are wet by the rains or by the dews. The water enters, not at the base of the trunk where the large roots are found, but only at the extremities of the finest rootlets. At these points the rootlets are clothed with a "nap" or "pile" of fine hairs. These root-hairs must not be confounded with the fine branches of the root, for it is only the finest branches which are covered with the close-set hairs. Consequently, it is only the youngest and most delicate parts

of the root which allow the entrance of the water. But the water escapes from the leaves, and from the point of entrance to the point of exit is a far cry for the coursing droplets. How does it pass through this long space?

It is just here that our knowledge is most defective. We know a number of things that are true in regard to it, and we know a number of things which are not true in regard to it.

We know that it moves in the sap wood of the tree, and neither in the bark nor in the heart wood. Many of you must have made observations which are sufficient to establish this point. You have, for instance, observed that the bark of trees might be peeled off for a considerable distance, and that the leaves would still retain their green color and their freshness. In many cases, indeed, the mere removal of the bark from the tree is not sufficient to bring about its death until several months, and in some trees not until several years after the injury. Death, however, is inevitable sooner or later; but the fact that the leaves remain fresh for so long a time is evidence that the supply of water is not interfered with. Death ensues from a totally different cause, namely, from the starvation of the roots in a way which will be explained later.

Again, you must have observed that it is quite possible to have the entire heart wood of the tree removed, as is often done by decay, and yet to have the leaves remain fresh and green for an indefinite time. In fact, the rotting-out of the heart wood scarcely interferes with the vitality of the tree, except as it renders it mechanically weaker, and consequently more liable to be overthrown by storms. If any further proof were needed, it is perfectly possible to show experimentally that the sap wood alone is engaged in the transfer of the water required for evaporation by cutting into it. A saw-cut which passes through the sap wood, but leaves the heart wood intact, brings about within a very short time the withering of the leaves. In some trees, indeed, a cut which severs only the outer youngest layers of the sap wood will produce the same effect, since in such trees only the youngest layers of the wood carry the water. By experiments on twigs it can be demonstrated that withering will occur even if the bark is almost completely uninjured.

We know the water to supply evaporation moves chiefly in the cavities of the elements of the wood. The wood of the tree is composed of a large number of *fibers*—that is, elongated cells pointed at both ends, and of *ducts*—that is, tubes of great length formed by the breaking together of rows of cells placed end to end. You can get an idea of the manner in which these ducts are formed by imagining a series of round pasteboard boxes piled one on top of another, after which the top and bottom of each is removed, so that, instead of a series of separate chambers, we have now a long tube. The fibers may be likened to a series of lead pencils, sharpened at each end, and placed in contact with each other, the points of the lower ones overlapping the next ones above and fitting in between them. In my illustration the cavity of the fiber would be represented by the lead, and it would be more accurate if we could conceive of the cavity as not extending entirely through the pencil, but stopping short of the point. Minute pits extend from the cavity of one of these fibers to the other, and the walls also of the long ducts are also marked by larger thin spots. It is in the cavities of these ducts and fibers that the water chiefly travels.

We do not know what part is taken in this ascent of the water by those peculiar elements of the wood which you know by the name of silver grain or the pith rays. You will remember these as the shining plates of tissue which extend from the center of the wood toward the circumference. They are particularly prominent in the oak and show most when it is split "with the grain." It is probable that these cells have a great deal to do with the movement of water, but their exact *role* is not fully agreed upon.

We are in almost total ignorance at the present time as to the force by which the water is elevated through so many feet. There are trees in the gullies of Victoria, Australia, whose height exceeds 470 feet, and we must invoke some force which is able to raise water from the level of the soil to the level of the highest leaf. A year ago we thought we had a hypothesis which would account for this movement, but later researches have brought to light some facts which are at present totally irreconcilable with what was a most charming and, at that time, a most satisfactory explanation, and we shall be obliged to abandon it unless the wine of the new knowledge can be held by the old bottles of theory.

At the time when our knowledge of capillarity was greatly extended by the celebrated researches of Jamin, it was thought that we had knowledge of a force adequate to account for the raising of water to these great heights. The fibers and ducts which I have described to you seemed to answer very perfectly the requirements of capillary attraction, and it was thought that this force, by reason of which water rises through narrow spaces, was the one sought. But the rise of water in capillary spaces is proportioned to the size of the opening—the smaller the opening, the higher will it rise. With the decrease of the caliber of the tubes, however, the friction increases enormously, and only small quantities will be able to be moved on account of the diminished size of the tubes. It was quickly seen that, in order to account for a rise of even a hundred feet, the tubes of the wood must be vastly smaller than they really are.

When it was found that the air in a plant is under a less pressure than that outside the plant, it was thought that the force had been discovered, and that atmospheric pressure furnished the explanation. Negative pressure, however, on the interior never reaches zero, and consequently cannot account for a rise of more than 33 feet.

Again, what was called root pressure was invoked to explain the phenomena. It is found that water is absorbed at certain times so rapidly by the roots that it exists in the plant under considerable pressure, and it has been claimed that root pressure, combined with the other forces already known, was adequate to account for the rise of water; but this, too, has failed us.

It is perhaps the greatest weakness of the last theory (that of Godlewski), which we have just had to abandon

temporarily at least, that it depended for its explanation upon the indefinite and illusive "vitality" of certain portions of the plant. Godlewski's brilliant hypothesis, which ascribes to the activity of the living cells of the medullary rays the function of receiving from lower levels the water and passing it on to higher tissues through rhythmic variations in their osmotic power, due possibly to respiratory changes, may yet hold the clue which we are seeking. But when Strasburger jacketed a young tree for a distance of 35 feet, and kept it surrounded by hot water until all of the living cells in the tree trunk were unquestionably killed, and when under these circumstances the water supply to the leaves was not interfered with, so that they remained green and fresh, we were obliged to conclude that the lifting of the water is not dependent upon the life of the tissues directly, but that it is evidently carried on by a physical process yet to be explained.

Before passing from this topic of the movement of water which supplies evaporation, I must allude to a very common and widespread idea—at least I judge it to be widespread, because it is so frequently propounded by my students—that "the sap goes down in winter and up in the spring." Just where the sap is supposed to go in winter is not exactly clear, since, if the roots are absorbing water in the fall when the evaporation is diminished, they are likely to have quite as much water as they can hold already. The conception, apparently, is that all of the water lodged in the trunk and spreading branches goes downward into these roots. It needs, however, only the most casual examination of trees in winter to discover that at this time they are almost saturated with water. The twigs of the hickory tree, for example, will be frozen on a cold day in winter, so that they are as brittle almost as glass, and one can snap off a twig half an inch in diameter as though it were an icicle. The same twig, when not frozen, on a mild day will be so tough that there will be no possibility of breaking it.

Again, if one cuts off a branch from a tree in winter and brings it into a warm room, he will quickly discover that water is oozing from the cut end, showing that the twigs are almost saturated with it. As a matter of fact, the water in trees increases from midsummer or early fall to the beginning of growth in early spring. There is thus no necessity for any "going up" of the sap in spring until the leaves are expanded and the water with which the tree is already saturated begins to be evaporated from the foliage.

BLEEDING.

A second movement of water in trees is that which occurs in the so-called "bleeding." The bleeding of trees occurs at different times of the year, either before growth has begun at all or just as it is beginning. In the two cases the cause is quite different. We find a good example of both sorts of bleeding in the gathering of the sap by the sugar-maker. This gathering begins at the time when the ground is still frozen and the roots are almost or quite unable to absorb any water, but at a time when the air is warmed through the middle of the day by the increased heat of the sun. At first the expulsion of water from wounds made in the trunk is due to the expansion by heat of the air inside the smaller branches and twigs of the tree. This sets up at once a pressure upon the water, and this pressure is transmitted to all parts of the tree. The water with which the tree is filled is thereby forced out as soon as an opening is made for its escape. Later in the season, however, the roots begin their work of absorption, and there is then set up the so-called *root pressure*, by reason of which the water is forced out at the same openings. The latter sort of bleeding is necessarily delayed until growth is about to begin, and is checked as soon as the foliage is sufficiently expanded to begin evaporation.

A bleeding similar to the last takes place at the hood-like tips of grass leaves, where the skin is nearly always ruptured. The little drops of water which accumulate here are commonly mistaken for dew, but are merely droplets exuded from the interior of the leaf, because the falling temperature of the air toward evening has diminished the evaporation from the leaves, while the roots in the warm soil are still absorbing water, and consequently producing an internal pressure. The movement of water in these cases of bleeding, it will be seen, is necessarily toward the point of exit, which may be above or below the point at which the pressure arises.

SECRETION OF NECTAR.

A third sort of movement of water is that which takes place in the nectaries of flowers and leaves. The flowers of our common linden, for example, secrete a considerable quantity of sweet fluid, which is sometimes misnamed "honey," but is properly known as nectar. Honey, by the way, is nectar after it has been digested by the bees. At certain points in the flower there are groups of cells whose special business it is to withdraw water from the parts below, and filter it through their outer walls, after having added to it the materials which make it sweet. The movement of water in this case is extremely limited.

THE TRANSFER OF FOOD.

The last movement of water of which I shall speak is of those solutions which contain the food of the plant. These materials are not those absorbed from the soil, or gathered directly from the air, but they are the substances which have been manufactured by the leaves out of the materials obtained from the soil and from the air. Since these foods are put together in the leaves, necessarily the movement of water containing them in solution must be in a different direction from that which supplies the evaporation. The materials thus manufactured in the leaves must be carried either to those parts which are growing or to those places in which they are to be stored for future use. It is manifest at the first glance, therefore, that the direction of the movement must be in general *inwards* from the leaves, and, since the roots require for their nutrition a considerable amount of these substances, there must be a very decided *downward* movement to supply them.

Now it is plain that these solutions of food must keep out of the way of those portions of the water which are chiefly to supply the evaporation from the leaves. We have seen

that the latter travel in the sap wood. The food currents, however, travel almost exclusively in the inner parts of the bark. You will therefore understand why stripping off the bark, or even cutting it, ensures the death of the tree eventually, even though the leaves remain long unwithered, since the roots depend upon the food formed by the leaves, they perish when severed from their base of supplies.

The movement of the evaporation stream is relatively rapid. The movement of this food current is relatively slow. We do know something of the mode of movement of these food currents. They are apparently brought about through the process known as diffusion, or osmosis, and are therefore necessarily slow. The cause of the movement is practically the same as that for the movement of oil in the lamp-wick, although it is by no means by the same method. The oil in the lamp-wick travels upward because at the top it is being destroyed as oil by reason of the heat of the flame. So the direction and existence of the current of water carrying food is because the various substances dissolved in the water are being altered at the place of growth or storage into new materials. The commonest of these food substances is sugar, and at the growing point of the stem, for example, the sugar is being constantly destroyed as sugar and is being converted into cellulose or protoplasm or some other material. So long as that alteration is going on, just so long will the sugar particles move toward that point.

But I must not impose further upon your patience. I have tried to sketch very briefly, and only in outline, the different movements which the water in the plant is undergoing. I have said nothing of the extreme variety of materials which may be found in this water in different plants, or even the variety found in the same plant at different times, but have endeavored merely to show you that there is going on constantly in the living tree a series of molecular and mass movements, of which too few people have any conception. To our imperfect knowledge let me hope that some of you may contribute facts which shall enable us some day to explain the many things which are now obscure.

The Value of Irrigation.

Maj. J. W. Powell, Director of the United States Geological Survey, contributes to the *New York Independent* of May 7th, an article on irrigation, which is destined to attract wide attention. There may be little in the historical part of the discussion which is new to those who have read standard works on the subject, and little of a practical nature which will be new to the irrigator, but the publication of such an article by such an authority still has a great educational value. Maj. Powell says:

"The earliest agriculture of Europe, Asia and Africa began in arid lands. Turning to America it is discovered that this fundamental art began everywhere under like conditions of great aridity, on sandy plains and hot deserts. In the southwestern portion of the United States, the very last district of the country to be settled by white men, in some portions of Utah, Colorado, Arizona, New Mexico, Nevada and California, where natural vegetation is so rare that it scarcely gives character to the landscape, where sandstorms drive over the country, where naked plains spread under a lurid sky, and where the landscape is often one of naked rock, and where adamantine forms stand in groves and the trees are fossils buried in the rocks, the most ancient agriculture is found. For in the country thus described, the Indian tribes in centuries lost to history, cultivated the soil by artificial irrigation, and developed corn, cotton, potatoes, and other vegetables useful to man, while the rich valleys to the north and east were yet untouched by agricultural labor. Later, and before the discovery of Columbus, open glades here and there were cultivated, but such little patches were far apart, scores or hundreds of miles, and the art was borrowed from the arid lands of the pueblo region. In like manner the desert regions of Mexico and of Peru developed an ancient agriculture; so that everywhere throughout the habitable globe the first agriculture began in arid lands, and the first comparatively dense population was found everywhere in regions where the heavens refused sufficient moisture for crops to grow. This is the greatest paradox of history.

"Civilization sprang from agriculture. Two arts transformed early savage society: Agriculture and the domestication of animals, and the latter grew out of the former. The first fields were cultivated in arid lands, the first flocks were distributed on arid lands, the first cities were built in arid lands and the first civilized governments were organized in arid lands. Under torrid skies, on rainless, treeless plains, agriculture, the domestication of animals, art in metals, temple-building, cities and civilization had their beginning."

After reviewing the ancient record of irrigation and its effects on civilization in the old world, Major Powell approaches the subject of irrigation in the new world as follows:

"On the discovery of this continent the Latin invaders first found arid lands in Mexico, Peru and the southwestern portion of the United States; on a larger scale Germanic peoples found humid lands farther to the north. The Latin peoples from arid lands settled again on arid lands and discovered native people engaged in irrigation, as they themselves had done in the countries from which they came. The Germanic peoples found much less agriculture, only a few petty patches here and there, the art itself borrowed from the arid lands; but they found vast stretches of forest and prairie that could be cultivated without artificial irrigation, and they brought with them the industries of the humid lands from which they came. In the United States no arid lands and no irrigation were known to our people by practical observation until we acquired the deserts of the Southwest from Mexico, where we found the Indian engaged in tilling the soil by irrigation."

He traces the development of irrigation in the United States as a sort of second thought after the tide of settle-

ment had pushed beyond the limits of possible dependence on rainfall. He traces the introduction of the system into the various western States and Territories, and its stage of development in each. This part of the review he concludes as follows:

"The mention of California has been left till the last. When the great valleys, mountains and plains of California were brought under the dominion of the United States by Fremont and his coadjutors, they found a few Indians, a few Mexicans and a few Spanish grandees cultivating the soil by irrigation. Then gold was discovered, and an unparalleled exodus from the East poured an army of gold-hunters into the beautiful land. Towns and cities came into existence like magic. Mining was conducted on an extensive scale, and manufactories sprang up here and there. Gradually the newcomers engaged in the cultivation of the soil, often by artificial irrigation, and the art has made marvelous progress. Extensive and superior hydraulic works are now constructed, and many new devices have been developed by which to distribute water to the growing plants with the greatest economy and to secure the largest amount of agricultural development. Often the waters are carried over the lands in iron pipes, ramifying to the roofs of the trees and the shrubs, and the people of California have fields, vineyards, orchards, gardens and lawns fructified from the springs, brooks, creeks and rivers that are born in the cloud-capped mountains. *The most highly-developed agriculture of the world is now found in some portions of California.*"

Maj. Powell's admonitions to the people of the country, in commending this subject to their more careful consideration, are worthy of reproduction for the large and comprehensive views taken and the fundamental principles outlined. He says:

"This industry is new to our people, and they have yet to learn important lessons which the inhabitants of oriental lands have learned by centuries of experience. Some of these lessons are as follows:

"First—The waters of perennial streams that are gathered thereby, have to be divided among the irrigators. While the waters are abundant and the lands redeemed are but small areas, the distribution of water rights to farmers is apt to be neglected; but the time is at hand when, in many regions of the United States, water rights must be relegated to irrigators by some just method to secure equity and prevent litigation, and even to prevent social convulsions, which are already breaking out here and there.

"Second—The people must learn that the supply of water is insufficient to irrigate all land, and that only a small per cent of the total area of arable land can be converted into irrigable land.

"Third—The people must learn that the seasons of drought fix the limit of agricultural development; that seasons of great rainfall and plenty of water lead to excessive development of irrigation, so that when seasons of drought come, disaster and great suffering result.

"Fourth—The people must learn to construct irrigating works in such a manner that they will resist the forces of extraordinary seasons of flood. In every region a great flood comes sometimes; the maximum supply of water may be reached one year in a decade; when it comes, if the hydraulic works are destroyed, prosperity is transmuted into adversity.

"Fifth—The people must learn the importance of gauging the streams from day to day and year to year for a series of years sufficient to discover the maximum and minimum flow, in order that they may construct their works intelligently, and have definite knowledge of the amount of land that can be irrigated. The maximum must control the strength of the works, the minimum must control the area which can be permanently redeemed by irrigation, and the average flow will give the amount of land which can be cultivated from time to time in excess of the area of permanent cultivation."

California Walnut.

Col. Hatch is making progress with the California exhibit in the Forestry Building at the World's Fair. He has the outside of the structure nearly complete, and, with a couple of days' more work, will have put the finishing touches on the interior. As the California exhibit nears completion, the interest in it to outside visitors increases. It was at first thought that the New South Wales exhibit would prove a formidable rival, but since the California exhibit has taken shape, there is no doubt that it will, when finished, outclass any other exhibit in the building. California fortunately has one of the best locations in the Forestry Building for its exhibit. It occupies a space 52 feet in length by 19½ in width. It fronts on four aisles and is in such a position as to immediately attract the eye of the visitor upon entering the building.

A majority of the exhibits made by other States and countries have but one side of their display prepared for the eyes of the public. With the California exhibit it is different. In it there is just as much to see from the interior as from the exterior. Mr. Hatch has made this a feature of the exhibit. In its general outlines the California exhibit resembles an old-fashioned house. Each of the boards used in the siding is nine feet in height, with ornate molding trimming at the top. The structure has no roof, as that would shut out the light. Mr. Hatch has brought into play a rather peculiar system of dove-tailing in the construction of his house. The woods are all laid together so carefully that they appear as if they had grown together. Not a sign of nail or screw can be seen either from the exterior or interior. The woods, however, are all screwed together.

The wood used in the California exhibit attracting the most attention is the California walnut. Every expert who has visited the building has closely inspected it and pronounced it the finest specimen he has ever seen. Through repeated favorable comments made by visitors about the

walnut, Mr. Hatch has grown very enthusiastic over its future development. French walnut, which has heretofore been considered the finest and most costly of walnuts, does not begin to compare with the California wood, and, since it is known that the French walnut sliced down to the thickness of a thirtieth of an inch sells for 29 cents a foot, Mr. Hatch is of the opinion that there is a fortune for Californians who promote the industry. Mr. Hatch is strengthened in this opinion by an offer made to him by a wealthy veneer house of Cincinnati, which has sought to engage him to go to California immediately and buy up a huge stock of wood while its true value is yet unknown. While Mr. Hatch is not anxious to desert his post at Jackson Park, he will, however, return to California as soon as his work is completed to boom the wood and bring it before the attention of big veneer concerns all over the country.

The Town of Angels, Calaveras County.

Angels has a great name everywhere but at home, says the *Mountain Echo*. We, who have been here these many years, have watched its rise and fall in its primitive days, as well as its rise within the past few years. It has risen, it is true, but far from that station of activity with which it is credited on the outside. We believe in giving our own town a good name, and we desire it to have a good name abroad, but we disapprove of false rumors and unreasonable exaggerations concerning the place as one of great activity, a field that offers employment for countless hundreds of laboring men, farmers, miners, artisans and mechanics. It is true that the mines now in operation in Angels are all paying well, are extensive, and likely to continue in operation for many years, but for the employment offered in these mines there are ample men, and in a business point of view there are already enough business houses, trades and professions to accommodate the amount of business done here; and of competition in the various branches of business really more than there ought to be. There are many mines in this locality, which, if they were all in operation and as well developed as the Utica, Stickle, Matson and Gold Cliff mines, then there would be a good field for more people, more business houses, trades and professions, but such not being the case, these mines lying idle for the want of capital to develop them, we consider that there are establishments enough here at present to fill every requirement, and more, two laboring men to every one job of work.

What class of people do these false rumors that have gone abroad bring to our town? Has it been men of means who are ready and willing to invest in our mining properties, or has it been the class whose only capital is their labor? True, it is the latter; and also a class that care not to work, who are penniless upon entering the town, coming here to better their condition, and at the expense of the honest laboring men they flourish in idleness. There are now of the respectable class of laboring men and mechanics more than can find steady employment; yet the influx continues to pour into Angels without abatement, only to be apprised of the fact upon arrival that jobs are scarce and men to fill all vacancies as readily as they occur. This is the situation here at present, all the flowery rumors throughout the State concerning Angels to the contrary, notwithstanding. These rumors proceed in most instances from parties who know scarcely anything about the place or what is really being done here.

If you have means, want to invest in mining property, or engage in the development of other resources here, then, say we, you can find no better field than Angels; and if you have money and do not care to engage in any pursuit, looking for health and good climate, come to Angels; but if your labor is your own capital, don't come to Angels at present with the expectation that jobs are yawning for men. By the publication of this article, we desire to correct the exaggerated reports that have gone abroad, and give the public an idea of what Angels really is.

The Reno Reduction Works.

The Reno Reduction Works are prepared to reduce ores and will pay the highest price for gold and silver ores consigned to them at Reno. H. H. Beck, superintendent of the works, has succeeded in getting a rate of one cent per ton per mile from the Southern Pacific Company for all ores shipped to the works from points along the railroad. This is as cheap transportation as can be expected, and were it not for the low price of silver bullion the works would doubtless be supplied to their full capacity with ores from mines along the Central Pacific railroad in this State. The percentage deducted from the value of ores for reducing them is low and miners are paid in coin the moment the ores are sampled and their value ascertained.

It is the intention of the proprietors of the works to build smelters for reducing copper, galena and other base ores containing silver as soon as they are assured that ores will be furnished them in quantity sufficient to supply the smelter. They do not, however, propose purchasing undeveloped mines.

There is an extensive copper mine a few miles from Golconda, on the Central Pacific, which is developed to a considerable extent and which would supply several smelters steadily. There are also copper mines within a few miles of Winnemucca, which would doubtless furnish considerable ore—in fact there are a number of copper mines in Nevada which might be made to pay more or less profit if worked systematically and economically, and with the cheap rates for transportation for ores on the railroad employment might be furnished a large number of persons mining and smelting the ores from these mines if furnaces were erected.

The Reno Reduction Works are situated on the Truckee river and are run by water power, which is the cheapest yet discovered. The works are conducted by a practical metallurgist, R. D. Clark, and ores are treated by the most approved modern processes.—Nevada State Journal.

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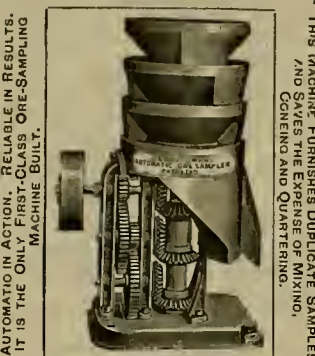
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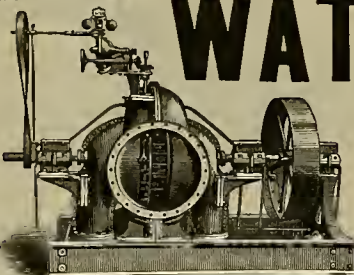
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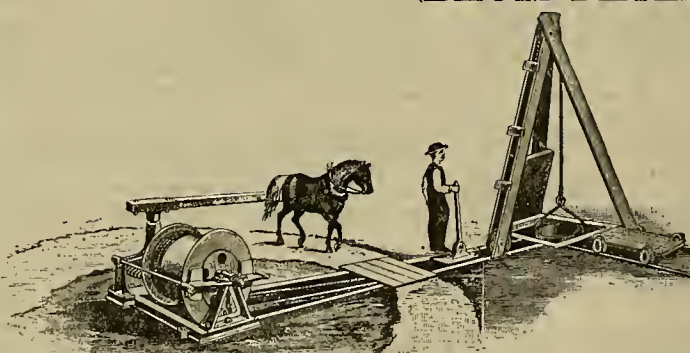
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Mechanical Progress.

The United States the Greatest Manufacturing Country.

R. H. Edmonds, a journalist of Baltimore, one of the most eminent authorities on the conditions of recent progress in the United States, contributes to *Engineering Magazine* an interesting and valuable paper, entitled "A Decade of Marvelous Progress," from which a few conclusions are extracted:

The United States is now the leading manufacturing country in the world. We have far outstripped all other nations in the magnitude of our industrial operations. It is almost incomprehensible that in ten years the increase in capital invested in manufactures would exceed the total invested only 20 years ago. The value of our manufactured products increased about 60 per cent; add 60 per cent to the output of 1890 and we would have \$13,700,000,000 in 1900—but that is too much to expect. The rate of growth in mining interests in this decade as in the last would make our mineral output in 1900 nearly \$1,200,000,000, while a smaller percentage of gain, only equaling in volume the total increase in 1890 over 1880, would bring the figures to over \$950,000,000. If our coal-miners add to the output of 1890 as many tons as they added to that of 1880, ignoring in this the percentage of growth, 217,000,000 tons will be produced in 1900. No other country in the world ever advanced in population and wealth as the United States is doing. The progress of the past shows no signs of halting. In fact, the development of our foreign and domestic trade and commerce and of our industrial interests is steadily broadening out.

Contrast our position and condition with Europe, with resources surpassing those of all Europe, with wealth-creating possibilities in soil, minerals, timber, and climate unequalled by Europe, and practically without limit to their profitable utilization, with a homogeneous population of 65,000,000 people unvexed by the arbitrary regulations of half a dozen different governments and free from the drain of standing armies, the United States justly commands the wonder and admiration of the world.

Great Britain is no longer the manufacturing center of the world, for we have taken the foremost position in that line. Its vast iron and steel business is yearly increasing in cost of production, while ours is decreasing. It cannot meet the world's growing demand for iron and steel because it cannot increase its production to any great extent. It produces less pig iron now than it did ten years ago. Much of its ore it imports from distant countries. Its cotton is all imported. It spends about \$750,000,000 a year for foreign foodstuffs. On the continent, every nation is burdened with debt and none of them can ever hope to pay off its obligations. Measured by their natural resources and advantages for continued growth against their debts and the many disadvantages under which labor, they are practically bankrupt. In all of them the cost of production and living must steadily increase. In the United States we have scarcely laid the foundation for our future greatness. In natural resources we are richer than all of Europe; we are paying off our debts faster than they are due; we have barely scratched the ground in the development of our mineral wealth and our agricultural growth can scarcely be limited.

A BIG PASSENGER LOCOMOTIVE.—Engine 999, of the New York Central, is an eight-wheel passenger locomotive. The drivers are four in number, 7 feet 2 inches diameter, tire $3\frac{1}{2}$ inches thick by $5\frac{1}{2}$ wide, secured to cast-iron wheel-centers by Mansell retaining rings; rigid wheel base 8 feet 6 inches; total wheel base 23 feet 11 inches. The engine truck wheels are 40 inches diameter, cast-iron spoke centers, tires fastened by Mansell retaining rings; wheel base 6 feet 8 inches. The weight on the four driving wheels loaded is 84,000 pounds, and on the engine truck 40,000 pounds. The boiler is of the wagon-top type, 58 inches diameter at the smallest ring and has 268 flues 2 inches outside diameter, 12 feet long. The fire box is of the Buchanan type, with water arch; and is set on top of the frame, 108 inches long by 40 inches wide. The total heating surface is 1930 square feet, with a grate surface of 307-10 square feet. The smoke box is extended and is fitted with a deflector and a perforated steel-plate spark-arrester. The stack is straight, 15 inches diameter inside. The exhaust nozzles are double, $3\frac{1}{2}$ inches diameter. The boiler is designed to carry 190 pounds pressure per square inch. The tender has a coal capacity of 6½ tons and carries 3587 gallons of water. It is fitted with a water scoop and is carried

on two four-wheel trucks, each 4 feet 5 inches wheel base, with 40-inch cast-iron spoke wheels and steel tires, the tires secured by Mansell retaining rings. The weight, loaded, is 80,000 pounds, making the total weight of engine and tender 204,000 pounds. The engine, engine truck, and tender are fitted with the Westinghouse air brake, and the engine is equipped with the air signal whistle.—*Railway World*.

Steel Making in the South.

A committee of the Tennessee Coal, Iron and Railroad Company have been making experiments with the Talbot open hearth basic steel process, at the works of the Jefferson Steel Company, North Birmingham, Ala. They report favorably on the process, both in the matter of adaptability to their requirements and in the value of the product. They recommend the erection of a steel plant and suggest that it should have a minimum capacity of 500 tons daily. This can be done at an outlay of about \$1,000,000. The mass of the ores in the South contain too much phosphorus for use by the acid process of steel making, whether pneumatic or open hearth; and while the brown ores are suited to the Bessemer basic process, they are not available to the Tennessee Company, which produces its iron from the much larger deposits of red ores. These do not contain phosphorus enough to keep up the heat in the after blow of the basic Bessemer process, and also have too high a percentage of silicon to permit conversion in the open hearth. It has been proposed to first burn out the silicon in the Bessemer converter, and then finish in the basic open hearth. The Talbot process eliminates most of the silicon by pouring the melted iron through basic slag, which is low in silicon and high in lime and oxide of iron. The silicon which has been reduced in the smelting furnace along with the iron, apparently takes up oxygen from the oxide of iron in the slag, staying in the slag, and the slag also takes up some of the phosphorus and a little of the sulphur, while at the same time the deoxidized iron of the slag is added to the charge, so that there is a gain of iron instead of a loss as by first blowing the charge in the Bessemer converter. This desiliconized metal is then ready for treatment in an ordinary basic open hearth furnace in the ordinary manner. The savings effected by this process over the old basic open hearth process are fourfold. The molten metal can be taken direct from the blast furnace to be treated by this process, thus saving the expense of remelting. With this process the cheapest iron made about Birmingham can be used, that is, gray forge. There is no necessity for the use of scrap when desiliconized metal is used, and the desiliconized metal can be put into the open hearth furnace hot, thus saving a large percentage of the time required to melt a cold charge. Gray forge pig iron, which for some time has been quoted a Birmingham at \$8 per ton, usually contains by analysis about 0.75 per cent of phosphorus, from 1.50 to 2.25 of silicon, and from 0.01 to 0.04 of sulphur. When the basic slag does not contain enough iron it is enriched by adding the necessary amount of brown hematite ore. The resulting steel is reported as of an excellent quality, low in phosphorus and sulphur, with from 0.02 to a trace of silicon.

This process, if it proves as successful in practice as in experiment, will be of great value, to the South in particular, by increasing the demand for its lowest priced iron product, and to the whole country, by increasing its supply of soft steel.—*The South*.

A BIG LOG CHUTE.—The log chute on Klamath river is near Shovel creek and Klamath Hot Springs, in Siskiyou county, California. This chute has an elevation of 850 feet and is 2650 feet long. The logs traverse this distance in about 32 seconds, and as a log chute it is a perfect success. The chute is built of round logs, 30 to 50 feet long and 20 inches in diameter at the small end and squared and hoxed into the butt of the preceding log, which makes a continuous log or stringer. Two of these stringers are placed side by side, securely fastened to the ground timbers, hewed on the inside to permit any-sized log to be shot down into the river. At this time 60,000 feet are run down daily, but it is proposed to double this amount as soon as an engine can be put on the logging railroad now built four miles into the timber. The Klamath River Lumber Company, located at Pokemona, Cal., where the Southern Pacific railroad crosses the Klamath river, is now driving logs from this chute to its boom and mills, 22 miles below.—*N. W. Lumberman*.

METHOD OF SOLDERING ALUMINIUM. Mr. L. Oliven, of 39 Wilhelmstrasse, Berlin, who uses tin, or ordinary tin solder, or an

alloy of tin with zinc for soldering aluminium, dips the article to be soldered under the surface of the melted alloy, and then proceeds to brush it with a steel or brass scratch brush until the solder "takes" and adheres to the immersed surface.

Scientific Progress.

California Pictographs and Hieroglyphics.

MRS. THEODORE H. HITTLE, S. F., Cal., in *Science*.

The study and investigation of the works of the earliest inhabitants of a country is now a science in itself, and is receiving more and more attention in all parts of the world.

Too little has heretofore been done in California, Alaska, Nevada, and Arizona to investigate, gather up and preserve the relics and works of the prehistoric races which inhabited these western territories, and, as there is now but little left, that little should without delay be carefully sought out and put in such shape as to remain a permanent possession. Of much, on account of our own carelessness, we have been despoiled, and much that yet remains has been more or less defaced and injured.

Government as well as scientific societies should look to the preservation of what remains of the structures, tools, utensils and weapons of the aborigines, and by all means endeavor to gather together and preserve by photographs the cipher writings which are yet to be found, and which, year after year, by the corroding hand of time and the more destructive hand of ruthless vandalism, are becoming more and more defaced and ruined.

The cipher writings yet to be found from Alaska to Arizona, if carefully gathered and studied, might enable us to learn many very important facts concerning the customs of the redskins and their early history.

In the Sierra Nevada mountains, near the so-called Summit Soda springs, about 14 miles south of Donner lake and at an elevation of about 6000 feet above the level of the ocean, the attention of tourists is attracted by numerous inscriptions incised in the rocks.

The most prominent, and the most inviting of attention of these, are those cut in the granite rocks, about 100 feet high, which stand nearly isolated on the right and on the left of the headwaters of the north fork of the American river.

The stream there is almost a little torrent and dashes over the rocks in cascades, and from there it plunges into and through a mountain gorge toward the lower level far below.

To a person standing near the fountain-head of the river, on the rocks against which it chafes, and which it is gradually but surely wearing away, and who takes note and truly appreciates the grandeur of the scenery, there comes a feeling of awe and reverence. It elevates the soul and calls forth a spirit akin to religious worship.

It was here in this sublime region that an unknown people left pictographs on the rocks pertaining doubtless to their history and religion. The seasons of centuries since then have come and gone; the snows of uncounted winters have covered them; succeeding springs and summers unnumbered have decked the mountains with yearly verdure, and the river has been rushing on and on ad cutting its bed deeper and deeper. All this we know; but we know nothing of those who wrote these ciphers on the monumental rocks. They have passed away.

Only with the help of science and long study and comparison can we hope to gain an inkling of the meaning these ciphers were intended to convey, and add, perhaps, some important facts to the ancient history of California—a subject now so full of interest and becoming daily of more and more interest to the world.

According to the Report of the Bureau of Ethnology at Washington, pictographs of the North American Indians are found at Santa Barbara and San Diego in California and in Nevada, Arizona, Oregon, Idaho and Utah.

In Nevada, great numbers of incised characters of various kinds are found on the rocks flanking Walker river. These are waving lines, rings and what appear to be vegetable, animal and human forms. Among the copies of pictographs obtained in various portions of the Northwestern States and Territories by Mr. Gilbert, one kind is referred to as being on a block of basalt at Reveille, Nev., and is mentioned as Shiouma or Mosquis.

This suggestion is based upon the general resemblance to drawings found in Arizona, and known to have been made by Mosquis Indians.

In Oregon, numerous boulders and rock escarpments at and near The Dalles of the Columbia river are covered with incised or

pecked pictographs. Human figures occur but other forms predominate. From Lieut. J. H. Simpson's Topographical Bureau Report we take the following: "At the Rio de Zuni, in 1849, we met Mr. Lewis, who had been a trader among the Navajos, and, according to his statement, had seen inscriptions on a rock on his travels to and fro. He offered to guide us. He led us to a low mound. We went up and found inscriptions of interest, if not of value, and of them some dating so far back as 1606. The rock is since mentioned as Inscription Rock."

Mr. G. K. Gilbert discovered etchings at Oakley Springs, eastern Arizona, in 1878, relative to which he remarks that an Orabi chief explained them to him and said that the Mosquis make excursions to a locality on the Colorado Chiquito to get salt. On their return they stop at Oakley Springs and each Indian makes a picture on the rock. Each Indian draws his crest or totem, the symbol of his genus. He draws it once, and once only on a visit.

From Alaska to Arizona many inscriptions on rocks are found. Of some of them photographs have been taken. But so far as we know, none are as extensive or of such variety and of so ancient a date as those situated near the source of the American river.

These pictographs seemingly resemble and are written in much the same way as the Chinese ciphers, where each figure is a word and has a full meaning, and seemingly they should be read from right to left.

The Estimation of Manganese in Ores.

A new method for estimating the manganese in ores has been discovered by Mr. A. H. Low. The length of time occupied by the entire analysis is said to be never greater than 20 minutes, and none of the usual constituents of ores interfere with the working of the process. The following solutions should be prepared: (1) A standardized solution of potassium permanganate, approximately one-tenth normal. (2) A solution of oxalic acid containing 11.46 grammes of $C^2H^2O^2 \cdot 2H^2O$ per liter; the exact strength of this solution is to be determined by titrating with the permanganate in the presence of hot dilute sulphuric acid in the usual way, and then its value calculated on the basis that $C^2H^2O^2 \cdot 2H^2O = Mn$; it will be found that 1 cubic centimeter will be equal to 0.005 gram of Mn or about 1 per cent when 0.5 gram of ore is taken for analysis. (3) A saturated solution of bromine in cold water, an excess of bromine in the bottle; under the conditions to be described 25 cubic centimeters of this solution will precipitate about 35 per cent of manganese. In carrying out the analysis 0.5 gramme of the ore is treated in a 16 oz flask with whatever acids are necessary to decompose it, usually 5 to 10 cubic centimeters of hydrochloric acid or aqua regia are sufficient. After all traces of free acid have been removed by heat, the solution is diluted with 75 cubic centimeters of hot water and an excess of zinc oxide added. The solution is boiled to effect complete neutralization of the acid. An excess of the bromine solution is then added; about 25 cubic centimeters is usually sufficient, and never more than 50 cubic centimeters should be added. The solution is boiled for a moment or two until the excess of bromine is expelled, and an excess of zinc oxide should all the time be observed in the bottom of the flask. When all the red fumes have disappeared the solution is filtered on a paper 5 inches in diameter and the flask and precipitate washed several times with hot water. The precipitate and filter are replaced in the flask and about 50 cubic centimeters of dilute (1.9) sulphuric acid added. Into this mixture is run from a burette an excess of the oxalic acid solution, and the mixture is heated to boiling; afterward more oxalic acid is added if necessary, so as to complete the solution of the precipitate. After diluting the solution with hot water the excess of oxalic acid titrated with the permanganate solution. The amount of oxalic acid actually consumed by the MnO^2 is thus arrived at and the percentage of manganese can then be calculated.—*American Manufacturer*.

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EXPERIMENTS in propelling canal boats by electricity are to be made on the New York State canals, the Legislature having appropriated \$12,000 for that purpose.

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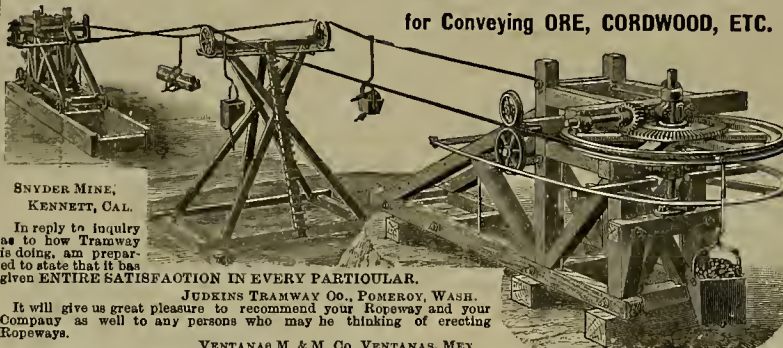
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Electricity.

Electric Haulage in Coal Mines.

The problem of economic haulage in mines has lately received considerable attention from mine-owners, who have found the expense involved in haulage alone much greater than in their opinion it should be. The mule has had his day as the principal factor in the haulage question, and the cable is under test, with results more or less satisfactory. The electric locomotive for mine work is comparatively a new-comer in the haulage field, but it has already acquired considerable prestige and bids fair to supersede both the mule and rope haulage.

An excellent example of the work done by the electric locomotive in coal-mining is shown at the Rock Springs coal mine, at Rock Springs, Wyoming. This plant was installed by the mining department of the Northwest General Electric Company, and is described in the *Electrical Review*.

About a mile from the mouth of the mine the power station, containing a dynamo of 80-horse power driven by a steam engine, is located. Current from this is delivered at a pressure of 550 volts, which allows of a drop of about ten per cent between the powerhouse and the mine.

The feed or supply wire is No. 000 hard drawn bare copper, making a complete metallic circuit. The trolley line is furnished with a circuit-breaker about 30 feet from the mine mouth, so that the current may be cut off from the mine when the locomotive is employed for switching purposes outside.

The locomotive used is of the G. L. M. General Electric Company type, of 30 inch gauge, 60-horse power. Its usual speed in this instance is about eight miles an hour. The cars used are of the ordinary coal-mine type, weighing each, when filled, about 3000 pounds; when empty, about 1000 pounds.

The economy attained by the use of this locomotive is strikingly illustrated by the fact that by its aid 30 cars were run from the loading point to the end of the track, a distance of about 6000 feet, there dumped and returned to the mine in 20 minutes. On another occasion the locomotive drew after it 30 loaded cars and pushed ahead 16 others from end to end of the road without difficulty. The track is built of 35-pound T rail, and has several switches and spurs necessary to the rapid handling of the cars.

It is not inappropos here to quote from a letter from an expert, giving an account of contact with the bare wire and the results thereof:

"Several men have been shocked since our plant began operating, but the effect is only momentary and they only laugh at it. The result has simply been to remove all fear they had of it. As I stated in my letter, this is a very dry mine, and so the only way one can get shocked is to stand on a rail and touch the wire. I have been shocked several times myself while handling the locomotive, through thoughtlessness. The other day a balky mule ran right into the wire with his head. He was knocked down. He got up and ran into it again three times, and was dropped in every instance. After that he was simply turned around and walked off to his work. I ought to remark that the shock does not knock a man down or burn him. The only description I can give of its effect, from personal experience, is a tingling sensation lasting, in the heaviest shock I received, not more than one or two minutes afterward in the hand that made contact."

This last is a fact which should reassure mine-owners who have any fears of danger from contact with the trolley wire. The element of danger once recognized as entirely absent, the electric locomotive can compete on equal grounds with any other system of haulage, with many points in its favor which cannot be urged by its competitors. We expect to see its adoption become general, both on account of the economy of its operation as well as its convenience of manipulation.

Electric Wiring and Insurance.

The fire losses during the last three months in the insurance world have been quite heavy, amounting to about \$45,000,000. If the proportion were continued, this would mean a yearly destruction by fire of about \$180,000,000 of property. This enormous loss is naturally worrying the insurance companies, and they are keenly on the lookout for new and unexpected causes. The fact that this is an increase over last year's losses makes them believe that some very recent cause is at the bottom of it all, and forthwith appears the following report from New York city:

"A leading insurance man says that for the six months ended December 31 insur-

ance companies of this city received in premiums about \$3,000,000, and paid out in losses about \$5,000,000. The losses came principally from electric wires and lights in buildings. For this reason the insurance companies have raised the insurance rates from two cents to 25 cents on each \$100."

This rather astounding statement naturally leads us to inquire into its authenticity, and another report comes, as it were, to counteract the bad effect thus produced, which reads:

"Fire and Water says returns from 76 cities for 1892 show that there were 1230 fires. Of the losses due to these fires only one-fourth of one per cent was caused by electric wires. Of all other causes that of these wires was the smallest."

It is obvious that these opinions differ most materially, and as the subject is one about which no definite conclusion can be reached, opinions will continue to differ. There, however, seems to be a decided impression among prominent officials in insurance circles, to the effect that electric installations increase the hazard on fire risks. It is a difficult matter to get down to the root of the question in this abstract subject, wherein statistics are the only means of furnishing any information, and even their application is entirely theoretical. But let us take a few facts, which in a statistical way are about as authentic as any others that can be obtained.

After a collective canvass of several prominent insurance officials, the following figures, which may be liable to fluctuation, were obtained. It is estimated that about 75 per cent of the fire losses are due to "causes unknown." Since the extensive installation of electric light and power plants, it is imagined that about 25 per cent of the losses have as their origin imperfect wiring, and of this 25 per cent two in 30 have been traced directly and positively to defective electrical construction. By simple calculation we find that the proportion of fires caused undoubtedly by defective electrical construction is $1\frac{1}{4}$ per cent. Thus we see the apple of discord is imperfect wiring, and as soon as this factor is eliminated the risks attending electric light and power installations will be practically nil. It should, however, be stated that the quality of wiring work is improving daily.

The insurance companies are, however, "reaping the whirlwind" from the policies on plants which were wired three or four years ago by incompetent men, for they claim fires are continually resulting from imperfect insulation and bad joints. The companies now refuse to grant policies unless all rules laid down for perfect wiring are rigidly complied with, and it follows as the night the day that with better insulation and more careful work electrical installations will be recognized as the safe system, and will be looked upon with great favor by the insurance men.

MM. LAGRANGE AND PAUL HOHO, who for some little time past have been investigating the phenomenon of the luminous sheath which surrounds a fine wire when used as the negative electrode in an electrolyte, recently made a communication to the Comptes Rendus with regard to an interesting utilization of this fact. These investigators found that a piece of iron ten centimetres long and one centimetre in diameter could be heated by the proper arrangement of non-conducting screens, in alternate centimetre-long sections, the heated sections fusing while the cool sections were still quite cold. So rapid was the heating that a rod of iron could be made white hot at the surface before the interior was affected, so that by suddenly making and breaking an electric circuit, the surface of a piece of iron could be suddenly heated up and then quenched in the electrolyte. The application of this process to the tempering of springs is obvious, and one may perhaps be permitted to see in it the germs of a new method of giving a hard surface to an armor plate.

PURIFICATION OF SUGAR.—A short article in *L'Electricien*, taken from *Genie Civil*, refers to the possibilities of the application of electrolysis to the purification of sugar. It speaks of the Fabrig process, which consists in bleaching the sugar by means of ozone produced by passing electric discharges through the sugar. In recent experiments made in Hoym, Germany, the rebeated juices are subjected for eight or ten minutes to electrolysis between zinc electrodes (35 to 40 amperes, 4 to 5 volts), when a thick viscous deposit will precipitate at the positive electrode, which gradually falls to the bottom and which is separated from the liquid by filtration; this deposit is one-third oxide of zinc; the juices and the sugar are absolutely free from this. Regarding the possible inversion of the sugar by the cur-

rent, as has been suggested, he thinks there is no reason to fear it, judging from the experiments of Mr. Groinigg, which have been very successful.

Useful Information.

A Short History of Stoves.

The cook stove, as well as that for heating, is in its comparative perfection a matter of the past 50 years. To those who can go back to that time, the expedients by which our grandmothers brought their edibles to such a state that they were even digestible would be a marvel to those who never had the fortune to have the experience of genuine camp life. The tin-baker and the bake-kettle have passed away, and through many evolutions, the modern range, with hot-water attachments and the folding gas stove, have left little to be desired. The stove is an invention, however, of antiquity, traces of it having been found in the historical annals of China and Japan, and fragments unmistakably pointing to such an article were found in the ruins of Pompeii.

Large, clumsy stoves were made at an early day in Holland, Germany and England, and to this day in those countries the same forms and styles to a considerable extent are used. In Italy, at the present time, in the small towns, an iron box resting on the ground, with side handles and rude holes cut for draught, is used. In some cases even iron is not employed, but in its place terra cotta and stone are substituted.

The stove in America is chief in its civilizing tendencies. To get a good stove in the country districts is the first thought of a married couple, and the advantages of every available pattern are fully discussed in advance.

The American stove dates back to 1742, and for it credit is due to the busy, level brain of Benjamin Franklin. It was then the open front, or a departure from the ordinary fireplace. This stove was introduced into England, and everywhere the "Franklin," as applied to its peculiar form, is known to-day. It held sway long into the present century, and then inventions and improvements rapidly followed one another, beginning with the ordinary air-tight (over which *pater familias* spent many anxious hours debating whether it added to the bills of the physician) down through every kind of draughts, all sorts of dampers, beating stoves in which the fire would not go out, all sorts of gas stoves, until now they essay at electrical heating.—Hardware.

To Prevent White Efflorescence on Brick Walls.

The white efflorescence which so often disfigures our otherwise handsome brick buildings and gives to them an appearance of dilapidation not justified by their age, is said to be due to the presence of lime in the clay from which the bricks are made. Numerous remedies have been suggested, generally consisting of a kind of paint to be applied after the bricks are laid in the wall, and while generally successful in so far as they prevent the exudation of the discolored element, do not preserve the original appearance of the wall. *Thouindustrie-Zeitung* says, that where lime is the cause of the efflorescence it can be entirely prevented by dipping the bricks before burning into dilute acid. The strength of the acid should be determined by the amount of lime present in the clay, the greater the amount of lime the more dilute the acid. For ordinary clay, it says a solution composed of 40 quarts of water to one of hydrochloric acid is the best for the purpose, and the quantity sufficient for dipping 500 bricks, when the solution should be renewed. The bricks having been dipped and thoroughly dried in the sun are dipped and dried again just before burning. The operation only adds 12 cents a thousand to the cost of the bricks in Germany, and while the added cost would be somewhat greater in this country, the idea would seem to be worthy of adoption by our brick-makers, who could command a moderate increase on the price of their material by guaranteeing the absence of the white coating.—Northwestern Architect.

The New Ocean Voyager.

The Campania was built by the Fairfield Co. for the Cunard line, and is now the largest steamship in the world. On her trial trip, in shallow water, she ran over 22½ knots per hour, and on a longer run she approached 23 knots, or 26½ statute miles an hour. The Campania is 620 feet long by 65 feet 3 inches broad and 43 feet deep.

The following figures show the relative

sizes of some of the big ships which have crossed the ocean:

	Campania.	Paris.	Teutonic.	Great Eastern.
Length.....	620	527	565	680
Beam.....	65	63	57.6	82
Draught.....	32	29	26	31
Horse power.....	30,000	20,100	17,000	7,650
Tonnage.....	17,000	10,500	9,686	20,000

New Method of Blasting Coal.

In using the Plom and d'Andrimont excavator for forming a chamber at the end of shot-boles, an ordinary shot-hole is first drilled in rock or coal; when in the latter, by an ingenious modification of the Lisbet hand-drill, and then the excavator or chambering tool is introduced and rotated by the ratcheted-lever or handle, according as the coal presents greater or less resistance. By bolidging, from time to time, the nut of the screwed end of the shank the latter is moved forward so as to cause two blades to open out and excavate a chamber, which may be as much as a foot in diameter. The coal dust produced by the boring is withdrawn by the coarse, screw of the shank. When the chamber is formed, the nut is turned in the opposite direction, an action which causes the blades to collapse, so that the tool may be withdrawn from the hole. The charging, which should be by gunpowder for coal, is effected by a brass or copper tube, having longitudinal slots at the end. The tamping consists of a wooden plug carrying the ignition fuse and held in place by clay filling. As the action of the gases due to the explosion is exerted in a direction perpendicular to the face, the roof and floor are unaffected and the coal is detached in large blocks, which are not thrown forward but only pushed outward for a few inches. The proportion of large coal is therefore increased, while a considerable saving of labor is effected. This appliance is used at the Hasard Colliery, near Liege, and has been favorably reported upon by the managers of several collieries in Germany, including the Frederika Tiefbau, the Carolinen and Gluck, the Eschweiler, Prinz von Preussen, Konig-Ludwig and Frederick der Grosse.—Colliery Guardian.

Turkish Baths and Heart Disease.

We see it so often stated that those who have the slightest trace of heart disease should never take Turkish baths that we welcome a word on this subject from the *London Lancet*, which says: "It would be idle to say that the Turkish bath should never be employed in any case where there is any disease of the heart, for attested records show that patients suffering from well-marked valvular disease have in many cases derived considerable benefit from its use, and the records of more than one lunatic asylum show that the influence of the Turkish bath in varied forms of mental disorders and cerebral disease, has been most beneficial. In fact, in dropsy from heart disease, as in dropsy from kidney disease, in albuminuria and mania, the Turkish bath has proved a very potent agent. So that it would be injudicious to lay down as a canon, that either heart disease or cerebral disorder contra-indicate the bath; they may prove direct indications for it. But they certainly afford grounds for care and reason for insisting on close supervision and vigilant watching. The therapeutical effects of the Turkish bath deserve the continued study of the profession; it has proved itself, as we anticipated, a potent therapeutical agent. Sir John Fife, Dr. Barter, Dr. Lockhart Robertson and others have, on a large scale, applied most usefully this invaluable introduction of Mr. Urquhart, to whom a great debt is due for impelling the creation of these baths in London." This is exactly our own experience, but of course, as a matter of caution, patients with weak hearts should be watched and not allowed to remain too long in the hot room of the bath, nor should they enter when wearied and excited, nor when the bath is so full they cannot have instant attention when wanted.

NEW INSULATING COMPOUND.—Micanite, says *Electricity*, is a new material, lately brought into the market, and reported to possess very high insulating properties. It consists of ground mica and shellac mixed together, and rolled or pressed between plates to a uniform thickness. Both mica and shellac, as is well known, are materials of very high insulating capacity, and the advantage of micanite seems to be that it can be obtained in almost any shape, such as rings, washers, tubes, plates, etc. In addition to its high insulating capacity, it can stand a great deal of mechanical wear and tear, and a very high temperature without breaking down in insulation.

Earthquakes Foretold by Animals.

An Italian writer on the dreadful catastrophe which occurred on the island of Ischia, mentions those prognostications of an earthquake which are derived from animals. They were observed in every place where the shocks were such as to be generally perceptible.

Some minutes before they were felt, the oxen and cows began to bellow, the sheep and goats bleated, and, rushing in confusion one on the other, tried to break the wicker-work of the folds. The dogs howled, the geese and fowls were alarmed and made much noise; the horses which were fastened in the stalls were greatly agitated, leaped up and down and tried to break the halters with which they were attached to the mangers; those on the road stopped suddenly and snorted in a very strange way. The cats were very much frightened and tried to conceal themselves, or their hair bristled up wildly. Rabbits and moles were seen to leave their holes; birds rose as if scared from the places on which they had alighted, and fish left the bottom of the sea and approached the shores, where at some places great numbers of them were taken. Even ants and reptiles abandoned, in clear daylight, their subterranean holes in great disorder many hours before the shocks were felt. The dogs, a few minutes before the first shock took place, awoke their sleeping masters by barking and pulling them, as if they wished to warn them of the impending danger, and several persons were thus enabled to save themselves.

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July 12, 1890.

State of California, City and County of San Francisco—ss.: On this 12th day of July, in the year one thousand eight hundred and ninety, before me, George T. Knox, a Notary Public in and for said City and County, duly commissioned and sworn, personally appeared Samuel B. Connor and Andrew S. Grant, known to me to be the persons described in, whose names are subscribed to, and who executed the within and annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof, I have hereunto set my hand and affixed my Official Seal, the day and year in this Certificate first above written.

[Notarial Seal]

GEORGE T. KNOX, Notary Public.

I, M. C. HALEY, County Clerk of the City and County of San Francisco, State of California, and ex-officio Clerk of the Superior Court in and for said City and County, hereby certify the foregoing to be a full, true and correct copy of the original Certificate of Copartnership of Samuel B. Connor and Andrew S. Grant, filed in my office on the 12th day of July, A. D. 1890.

Attest my hand and seal of said Court, this 20th day of April, A. D. 1893.

M. C. HALEY, Clerk.

By Wm. H. Lyman, Deputy Clerk.

[Seal of Superior Court.]



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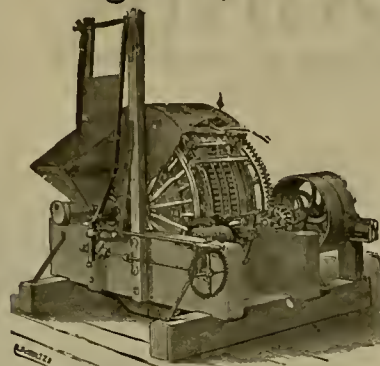
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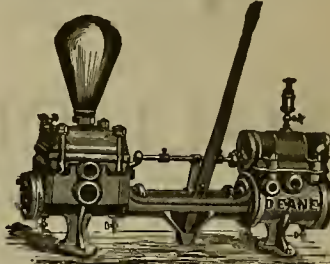
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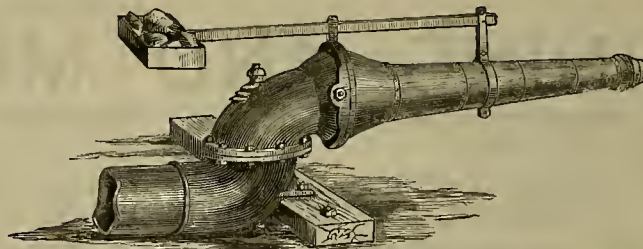
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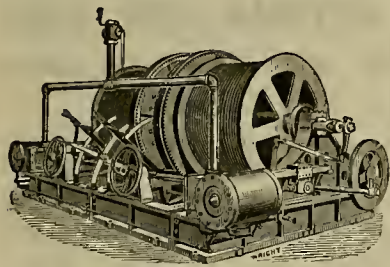
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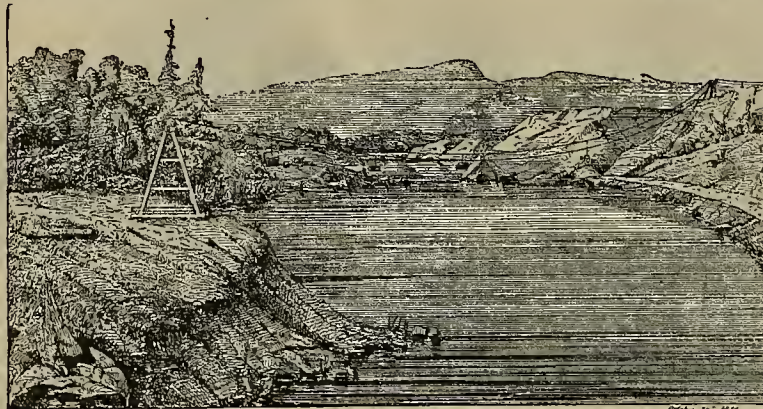
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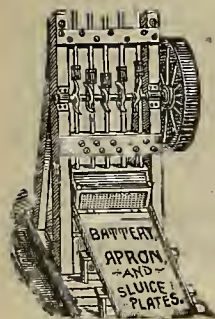
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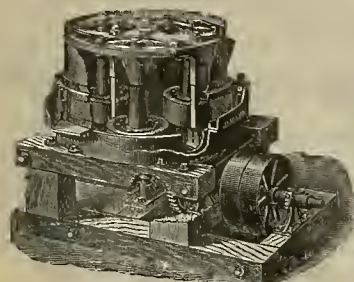
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KEYSTONE.—Amador Ledger, May 19: Superintendent Hale of the Keystones, Amador City, has been prospecting in a crosscut with a diamond drill. He has penetrated the greenstone about 80 feet, and it is proposed to go in 400 feet, taking out a core a little more than one inch in diameter. The drill is run with a water-wheel and is handled by two men. A Huntington mill has been added to the Keystone plant for the purpose of grinding the soft rock which is now being encountered. This machine is supposed to do as much work as 15 stamps will do. Superintendent Myers of the Bunker Hill has had the water all taken out of the Mayflower shaft and is now repairing the tunnel, which runs from Rancheria creek and taps the shaft. The lessees of the mine are expected to visit the property in a few days. The Pioneer, in Plymouth district, is looking better than at any time since Dr. Boyson procured the property. A. B. Summers, who has been pushing the work forward as rapidly as possible, a few days ago encountered a ledge of blue ribbon-rock which is very rich. This is of the same character as that found in the old Pacific. The New London of Plymouth, which was the property of W. Hyde & Co., has been sold to the people to whom it was bonded five months ago. N. J. Colman, an old Chester and El Dorado mining man, has been placed in charge and is arranging to secure some of the machinery from the old Pacific, which is now being dismantled. The new concern expects to use water from the high-pressure pipes of Haywards & Hobart. C. D. Lane and Chas. Nickerson, formerly of Sutter Creek, went into El Dorado county Monday to view the Oro Fino mine, which Nickerson sold in Lane & Haywards. Superintendent Tregloan, of the South Spring Hill, Amador City, for some time has had men at work running a drift from the Talisman to the Median, which belongs to the South Spring Hill Company. Blaisdell & Company have bonded a piece of property on the Amador and Sutter Creek road, opposite the South Spring Hill, and will begin work on the property in a short time. D. C. Wickham, of the Baldwin mine at National, El Dorado county, was in town during the week renewing his acquaintance with a few of the old-timers whom he knew here in early fifties. John Delzell, who for some time was the millman at the Hadenburg mine, has accepted a position in the mill of the Shenandoah mine, six miles from Mokelumne Hill. H. Tripp, whose mine is located near the Mokelumne river bridge, is getting ready to put a pump in the lower tunnel and thoroughly prospect it. D. Gutmann and Ed. Lemer came up from San Francisco last Sunday evening and the following morning went to the Irma mine, Pioneer district, in which they are interested. Superintendent Parks, of the Kennedy, informed us Tuesday that he expected to open up the vein on the 1650-foot level during the week. The ledge in this 1750-foot level is looking better this week than ever. The Kennedy is a great mine. J. B. Francis was up at the Irma mine, in Pioneer district, this week, and says the prospects continue fine. In the lower drift, which runs from the 200-foot level, the ledge is two feet wide, and Mr. Francis believes the rock will yield \$100 per ton in free gold. Superintendent Fisher asked Mr. Francis to have an air pipe and a blower sent up, which was done to-day.

Calaveras.

SUSPENDED WORK.—Mountain Echo, May 20: Operations were suspended at the Utica and Stickles mines last Tuesday and Wednesday, pending the cleaning of the Utica Company's ditch and the laying of new pipe.

AT THE UTICA.—Calaveras Prospect, May 20: Work in the Utica mine has been mostly suspended during the week, pending changes in the works on account of the new water pipes. On Tuesday nearly all of the miners were put to work on the ditch cleaning it out and enlarging it so that it will carry all of the water required. Wednesday was pay-day and all of the men were laid off for the day. In a few days all the connections with the new water pipes will be made and everything will be running. * * * Twenty new Tulloch concentrators are to be put in the mill. There will be ample power now to run all of the works of both the Utica and Stickles mines and mills. The men were to commence work with the midnight shift Wednesday night.

TO RESUME WORK.—It is now confidently stated that the Calaveras Consolidated mine at Robinson's Ferry will start up on the 20th. All litigation has been settled in a manner satisfactory to all parties and highly honorable to the company. Quite a force of men will doubtless be put at work extracting ore and milling, as the mine is well opened. The working of this mine will be a great help to the little community about the Ferry and will encourage others to operate mines in that excellent mining section.

El Dorado.

GRAVEL.—El Dorado Republican, May 20: Messrs. Jungerman and Hall, two San Francisco parties who have bought the Gignac gravel mine at Texas Hill, have arrived in Placerville and taken charge of the property. They are building a flume about 600 feet long and have purchased a quantity of 11-inch pipe at the Blair mine, which will be moved upon the ground at once.

THE UTICA COMPANY'S MINE.—Calaveras Pros-

pect, May 20: A force of six or eight men who have been at work in the Stickles mine at Angels has been sent by the Utica Company to Shingle Springs, El Dorado county, to operate a mine owned by the company at that place. One of the machine drills was also shipped there. Nearly all of the men who went are old residents of the town. Charles Lillis goes in charge of the men.

Humboldt.

ORLEANS BAR.—Cor. Blue Lake Advocate, May 20: I found all the miners at work, as they have lots of water. There is talk of some new claims opening up this summer near Orleans and all the old mines will run for weeks yet; so we expect good times here this summer. No idle men can be found here now, everybody being at work.

COAL.—Messrs. George Harpst and Supt. Ed. Ellis of the Gold Bluff mine, reached Blue Lake Saturday from the former's ranch on Goodman prairie. Mr. Ellis made a critical inspection while there of the outcroppings of coal on the ranch and brought away a nice specimen, though through mistake he did not get the fine specimen he had laid aside to bring along. The ranch, which embraces 600 acres, extends along Mad river, following the course of the stream, a distance of a mile and a half, and almost all this distance there are outcroppings of what appears to be a real good quality of coal. There are very thin layers of slate in the lumps taken out just beneath the surface, but the coal burns finely, and even the trash coal, as Mr. Harpst terms it (crumbly of the big lumps), when scooped up and put upon the fire run together and form one solid cake, making an excellent fire and burning until almost entirely consumed. Mr. Harpst has known of these outcroppings since January, 1892, and the more he investigates the better pleased is he with the indications. The outcroppings are almost all low down, near the bed of the river, though upon the hill back of the stream are surface indications of what appears to be a vein of semi-lignite coal. Since the foregoing was written Mr. Harpst has sold this Goodman prairie ranch of 600 acres to Mr. E. M. Wheeler, who, for the past year or so, has occupied the Capt. Gear ranch, across the river. Mr. Wheeler removed to his new home this week. He thus gets most of the land on which this coal has been found.

Nevada.

RICH STRIKE.—Grass Valley Telegraph, May 17: For several weeks the Evening Star mine has been looking exceptionally well, but last night it really excelled itself by turning out some of the richest ore yet seen from the ledge. The Evening Star is on Dead Man's Flat, and used to be called the Seven-Thirty. Mr. Taylor, the superintendent, brought to town some ore from the mine to-day, and that ore was rich enough to necessitate its being placed in the bank. The rock is filled with gold, and comes from the 200 south drift. The rock in the entire ledge is looking firm, and a crushing will be had during the first part of next month. The company expect to crush about 300 tons of ore at that time. The mine is being most carefully and energetically worked, and all economy is shown everywhere around its surroundings.

ABOUT COMPLETED.—Grass Valley Telegraph, May 22: W. S. Rogers and T. F. Anderson, who have the contract for building the hoisting and pumping works at the Central North Star, have almost completed their labors. They moved the machinery and are putting it in place. Mr. Rogers informs us that the work at the Central North Star will be completed in about two weeks. The gentlemen also have the contract on the Osbourne Hill machinery, and that will be completed in a short time.

THE DIAMOND AND MAUD MULLER MINES.—Grass Valley Union, May 21: A promising prospect that no doubt will be a piece of paying property in the near future is the Maud Muller mine. This mine is situated in the Forest Springs mining district and is near the Norambagua mine. The shaft is down to the depth of 60 feet and the ledge of 18 inches in width is in the shaft. The mine is being worked by Grass Valley parties, and they will continue to sink the shaft for some distance yet before they start to drift. The rock in this section of the country has always been very good, but the veins are usually small. This mine has a ledge of average size, however, and some rock which was brought to this office yesterday looks to be of good quality and assays at \$50 a ton. The Diamond mine, situated about three miles south of town on the old Colfax road, has commenced operations. A steam hoisting plant and a steam pumping engine have been placed on the property and work is being pushed at a rapid rate. The machinery was brought to the mine and put up in 16 days—a remarkably big undertaking for so short a time. The shaft is down to a depth of 90 feet, and they expect to sink about 60 feet farther before they will strike the ledge. Men are kept at work both night and day, and eight men are employed. Mr. Thomas is sinking the shaft as rapidly as possible, and, when the ledge is found, it will no doubt be a large one.

Placer.

NEW MINING ENTERPRISE.—Nevada Transcript, May 22: Frank Bell, Wm. Ambrose, E. R. and J. W. Brown and a Nevada county party have formed themselves into a mining company to be known as the World's Fair Mining Company, W. R. Arthur, secretary. They will go to work immediately on ground below Col. Davis' Mammoth Bar mine on the Middle Fork of the American river.

DAMASCUS DOINGS.—Colfax Sentinel, May 20: D. J. Sullivan, superintendent of the Pioneer mine, has returned from a trip to the bay. Quartz mining has quite a boom at present in the Humboldt Canyon district. Ed Ford & Co., who have one of the best locations in the dis-

trict, are now pushing their work as fast as they can. They are grading for a ten-stamp mill and for a boarding-house. They intend to build a wagon road to connect with the Pioneer mine road. A drawback to their work is the lack of lumber, for which they must wait until the mills start up. Their ledge is a true fire-vein and shows plenty of free gold. Ford & Co. are pioneers in this district, and we wish them unbounded success, as they have labored under many difficulties to get their vein opened. J. Patrick, who has leased the Dorer mine, has quite a force of men at work, and is running day and night. This ore shows up well. The Pioneer mine is running full blast and paying dividends monthly. Take it all together, times will be lively in here this summer.

RIVER CLAIM.—Messrs. Gould and Jordan, who have a river claim on the North Fork of the American river about three miles south of Gold Run, are at present engaged in preparing the claim for summer work. Several men are at present engaged in working for them, and quite a number have been engaged to work as soon as the water in the river is low enough to permit. The claim is located where considerable mining was done in early days, but much ground that will pay yet remains to be worked. The Hidden Treasure at Sunny South is working a larger force of men than has been worked for years. The Sells Bros. at Bath are running a prospect tunnel on their quartz ledge. Crangas & Federer are taking out good pay from their gravel mine at Brushy near Forest Hill. Albrecht & Co. are driving ahead a tunnel in their mine, the Mammoth, which is situated adjoining the mine of Crangas & Federer. They have only a few hundred feet to run, when they will be in the same channel which is paying Crangas & Federer so well. They have now out a call for bids to run a part of the tunnel. P. Jourgensen of Sunny South, who has been working for some time at his mine in Duncan Canyon near Damascus, has struck rich pay. Mr. Jourgensen is an old miner, and has labored for a long time in his endeavor to strike pay. He has a large family and has struggled for a long time for the well-deserved good fortune that awaits him.

Plumas.

GOON STRIKE.—Plumas National Bulletin, May 20: While in Greenville we learned from Archie Warren that Angus Cameron had struck good pay in his drift mine at Oak Flat on the North Fork. For several years he has been driving a tunnel from the canyon to tap an ancient channel through Oak Flat between four and five miles in length. This tunnel is in 800 feet. A short time ago Mr. Cameron began an upraise from the tunnel, and, after proceeding about 20 feet, broke into a large channel of fine gravel, two carloads of which paid him \$9. His faith and energy have at last been rewarded, and his friends will be glad to learn of it. It certainly does seem as if he would be amply rewarded. Although the explorations have not been those which have been made, they show conclusively the existence of a rich channel for many miles through that section of country.

TAYLORVILLE NOTES.—Plumas National Bulletin, May 20: While in Taylorville, we learned that Jos. Gruss is running his mill on fair ore from the Genesee mine. A. Drsgovich is prosecuting work on Grizzly creek for a Chicago firm. J. S. McDonald will soon resume work on the Lodi quartz claim. The outlook for him is promising. John Sobrero is building an arastra to work ore from a development near the Genesee mine. Brandt & Knox have been taking out and crushing ore. W. S. Dean has started work at the old Peel mine. C. Morane is pining on Grizzly creek. J. C. Borden will work the Pilot. The tunnel is in 130 feet. He has but a short distance to run to tap the ledge whose croppings prospected well. R. W. and James Young own the Premium mine, and have been taking out ore. They begin crushing this week.

FROM SKOWHEGAN.—C. H. Clark came down from the Skowhegan mine, situated about 12 miles from Nelson Point between Nelson and Poplar creeks. He reports about four feet of snow in that section. He is operating his mine with prospects of good success. The claim is looking well. John Simpson is at work on a quartz ledge at the head of Squirrel creek. He discovered a vein last winter, which prospects well. The Pittsburgh Co. is at work in the channel of the West Elizabeth drift mine, and is taking out gravel. While on his way down, Mr. Clark met a California lion, a big fellow, about 30 feet away. He felt himself in close quarters for a few moments. He yelled at the lion. This caused the ferocious beast to face Mr. Clark, but the animal took fright and sprang off into the woods.

Siskiyou.

A NEW QUARTZ MILL.—Yreka Journal, May 24: A. G. Myers has purchased a new quartz mill and will put it up immediately in Quartz valley. It is known as the Crawford mill. It is something new in this part of the country. It is vastly different from the old stamp mill. This new mill arrived in Yreka the latter part of last week and was hauled away to its destination on Monday. While here we took a look at it as the different parts lay at the depot. It consists of a large circular iron frame about four feet in diameter, in which a number of large metal balls are rotated. The balls are 12 or 15 inches in diameter and weigh several hundred pounds. These, with several other parts, make up the mill. It will grind the quartz to an almost impalpable powder, and the gold particles alone, owing to their specific gravity, fall through the space into the mercury bath, while the tailings are carried upward by the force of the water and flow out over the top. It is claimed that this mill will grind the ore so finely that every particle of gold is set free and that it will save a greater percent of gold than any other process; also

that pyritic and other rebellious ores can be worked successfully by this method. Our mining interests are great in this country and the success of this mill will be of great interest to the miners and people in general.

GRAVEL.—The Greenhorn blue gravel mine had a little mishap last week. The pump, which has been doing good service for some time, gave out under the great pressure of work. Fifteen men have been at work on this mine for some time, turning out a quantity of "dust," but they will be laid off for a few days. The company telegraphed at once for another pump—larger and better than the old one. This mine is now an assured fact, as the amount of ground prospected reveals enough of good-paying gravel to last them for years. This should be gratifying not only to the projectors, but to many others, as it affords work for many and will put many a dollar in circulation. Mr. A. G. Myers has bought the Shores mine, in Quartz valley, and will immediately put up a Crawford mill. We understand that he paid \$3000 for this splendid property. So the good work goes on. The Red Hill mine, in Salmon River district, owned principally by Parker Bros., of Etna, is turning out well and is proving to be a very rich mine, so we are informed. Messrs. Murray & Co. have started up B. Lee's blue gravel mine at Greenhorn. They have put a pump in the shaft and now have it clear of water. This mine showed a splendid prospect, and no doubt it will be successfully worked.

Santa Clara.

RAN MOUNTAIN DISTRICT.—Saratoga Standard, May 19: On Tuesday last L. Radovich, a brother of Boz Radozich of this place, brought some specimens of manganese iron ore, cinnabar ore, magnesite and nickel ore to this office. Mr. Radovich has just arrived from the Red Mountain mining district on the borders of Santa Clara and Stanislaus counties, and says that things are flourishing in that section of the hills. In 1890 Mr. Radovich first discovered the mines from which these specimens are taken, and which are situated adjoining the old Grayson quicksilver mines. The mines are some 56 miles northeast of Saratoga and 36 miles southeast from Livermore on the other side of San Antonio valley. The specimen of manganese is taken from a location which consists of two veins, while croppings indicative of gold quartz bearing ledges run parallel with the same all through the location. The cinnabar ore specimen is from a location adjoining the foregoing, and will average as a prospect from croppings about 4 1/2 per cent. In these croppings the nickel ore was struck and shows a streak from two to seven inches wide. The magnesite comes from a mine situated two and one-half miles northwest of the manganese deposit, and is located in a place called Dikeman canyon. It is from one of the finest ledges ever discovered on the Pacific coast, being pure white, carrying a high percentage and being in a solid ledge, running for a distance of about two miles at an elevation of 3555 feet above sea level. There is plenty of wood and water in close proximity, and good roads to the mines, so that no difficulty is experienced in working them. There are parties now negotiating with Mr. Radovich for the shipping of all the manganese for the English market.

Trinity.

CLEAN-UP.—Trinity Journal, May 20: A clean-up made last week at the Hubbard mine in Trinity county after a 20 days' run realized \$6000 worth of gold. This mine is only one of many in this county, as will be thoroughly shown when water in sufficient quantity is brought out to the ground. Lack of water has caused many rich locations to lie idle and undeveloped, but the time will come, and soon, too, when such ground will be worked so as to yield a handsome profit.

THE same paper also contains the following regarding rich quartz discoveries recently made: We were shown some very rich quartz this week by Ezra Thomas, of Shasta county, who has been in this county for several weeks prospecting. The quartz was from a ledge about two and one-half feet wide which Mr. Thomas recently discovered in the Lower Trinity country. Mr. Thomas is a prospector of 20 years' experience and says that there are lots of good mines in this county which in time will be worked with big profit.

Tuolumne.

TUTTLETOWN NOTES.—Tuolumne Independent, May 20: The Cardwell mine is working night and day. The shaft is down over 100 feet. The company means business and we hope to hear the glad tidings soon that it has "struck it," and a bonanza, too! It is rumored that on the 20th the Calaveras Consolidated Gold Mining Company will resume operations at Robinson's Ferry. It has expended a large sum prospecting on its property and has at last found good ore. Its success will bring others to invest in mines in this vicinity.

ETNA.—Tuolumne Independent, May 20: The old Etna mine, which has for some time been idle, has again commenced work under the management of Clarence Hawley. There is at present considerable water in the mine and a pump is in operation night and day. As soon as all the water is taken from the mine a force of men will be put to work in the old tunnel which is now nearly 600 feet in length, and matters will be pushed until the owners either win or lose.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, May 20: 1500 level.—During the early part of this week we continued to extract ore and old fillings from the 10th to the 17th floors. Above the 17th floor we connected with the old workings from the 1400 level, which we worked some years ago, consequently we have no ore to ex-

tract upwards from our openings. Thirty-six miners working on ore extraction on this level have been laid off, and all ore extraction stopped, for the reason that the ore producing points have become exhausted. Prospecting work will be continued on this level with a small force of men. A south drift has been started at a favorable-looking point, 75 feet above the sill floor of this level. The drift starts in quartz formation of low assay value, and will be advanced in unexplored ground. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working west from the old stopes, on the third floor, operating through the npraise, No. 6, carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. A south drift started at the end of the crosscut run east from a point 60 feet up in the upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 32 feet; total length, 82 feet; in porphyry and some quartz. Have continued to extract some ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Shipments of ore to the Morgan mill have been stopped, as the present output of the mine does not exceed 25 tons per day. This limited amount of ore comes from the 1650 level openings. Have extracted during the week from all parts of the mine 397 cars of ore about 390 tons. Shipped to Morgan mill 559 1230-2000 tons of ore. Average assay value, per railroad car samples, \$26.01. The assay value per battery sample of all the ore worked at that mill during the week (655 tons), was \$22.11 per ton. Bullion shipped to Carson Mint, assay value \$12,341.19.

OPHEL.—Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican Company.

MEXICAN.—On the 1565 level—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 19 feet; total length, 238 feet, continuing in porphyry formation carrying clay separations.

UTAH.—340 level—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 15 feet; total length, 166 feet; continuing in quartzite formation showing clay separations.

SILVER NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 10 feet, making the total length 347 feet; the face is in hard porphyry and low-grade ore. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 19 feet, making the total distance west of the joint shaft 3192 feet; the face is in porphyry and soft streaks of clay.

GOULD & CURRY.—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 9 feet, through hard porphyry; total length, 480 feet.

SILVER NEVADA.—During the past week the men have been repairing the joint north drift and easing timbers.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 19 feet, making the total distance west of the shaft 3192 feet; the face is in porphyry with seams of soft clay.

ANDES.—On 420 level have suspended work in west crosscut from north drift from east crosscut No. 1 north. We have cleaned out and retimbered 40 feet of east crosscut No. 3 from main north drift.

BEST & BELCHER.—200 level—During the past week west crosscut No. 2, started in northwest drift, 230 feet from our south line, has been extended 20 feet, passing through quartz of no value; total length, 100 feet. 900 level—West crosscut No. 4, started in southwest drift 112 feet from west crosscut No. 3, has been extended 14 feet; total length, 70 feet; face in soft porphyry and clay.

HALE & NORCROSS.—1800 level—Advanced the npraise in west crosscut on our south boundary 12 feet; total height, 36 feet; the top of upraise continues in quartz yielding low assays. Main shaft.—Are retimbering above the 1300 level and continue making the necessary repairs in main incline.

CHOLLAR.—Are repairing and retimbering north drift, 850 level. The east crosscut near the south line, 930 level, is out 222 feet; face is in porphyry.

POROS.—The north drift from east crosscut, 850 level, is out 76 feet; face is in porphyry and seams of quartz. The south raise 80 feet south of Potocai winze, 930 level, is up 85 feet; formation in the top is porphyry and streaks of quartz. The north drift from east crosscut, 930 level, is out 78 feet; face is in five feet of fair-grade ore. The north raise, 1000 level, is up 90 feet on the slope; the top is in fair-grade ore. South raise, 1000 level, 20 feet south of top of raise from 1100 level is up 36 feet; top shows six feet of fair-grade ore. Have started a crosscut west on 1000 level, 120 feet south of top of raise from the 1100 level; face is in soft porphyry. Extracted and sent to mill the past week 487 tons and 750 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 473 tons. On band at mill 100 tons and 1000 pounds. A average battery assays, \$24.90; average car sample assays, \$26.72. Shipped to the U. S. Mint, Carson, 422 pounds crude bullion.

EXCHEQUE.—At the Ward shaft are repairing the pump shaft and taking out old pipes below the 1600 level. The shaft is repaired to that point.

BULLION.—At the Ward shaft are repairing the pump shaft and taking out old pipes below the 1600 level. The shaft is repaired to that point.

ALPHA.—At the Ward shaft are repairing the pump shaft and taking out old pipes below the 1600 level. The shaft is repaired to that point.

WARD SHAFT.—Are repairing the shaft and taking out old pipes. Repairs are now completed to the 1600 level.

KENTUCK.—We continue to extract from two

to three tons of ore per day from the 160 level of the average value of \$30 per ton. On the 1100 level we are opening the sill floor and have extended the main drift south in ore of fair quality. The joint west crosscut near the Jack's south line has been extended 19 feet; total length, 50 feet. The face is in quartz and porphyry.

OCCIDENTAL.—Crosscut No. 6 from north drift, 750 level, has been advanced 17 feet; both crosscuts are in quartz and porphyry, with small seams of pay ore. The main south drift on 650 level has been extended 16 feet; total distance from No. 1 winze 302 feet; the face of the drift is in ore assaying about \$15 per ton. The Zedig drift, Sotro tunnel level, has been extended 14 feet; total length, 983 feet; the face is in porphyry with seams of quartz which show value by assay.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week, making the total distance from north line 118 feet; the face is in hard porphyry.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 49 feet; the face is in quartz, some of which gives fair assays. The west crosscut from southwest drift, 800 level, is in a distance of 28 feet; face is in quartz and porphyry.

Ferguson District.

PROSPECTS BRIGHT.—Pioche Record, May 18: The prospects for a good summer's work are bright indeed. Ferguson district may be relied on to materially help out this section of the country. John Viotti and partners, on their lease on the Jim Crow mine, are rushing the work and taking out some fine ore. They propose to make bay while the snn sbines. These day last was pay day for the Magnolia boys. The proceeds of the ore recently shipped to Salt Lake brought this about. As pay day has been passed for several months, quite a neat sum was distributed. The April Fool owners are constantly making discoveries which strengthen their faith in their properties. The latest is a discovery of extensive croppings immediately below the boarding-house, and within the April Fool side lines, which show free gold in abundance. Pieces knocked off for 75 feet along the course of this outcrop show free gold, and the owners are consequently elated. The force of men employed on the various properties will soon be increased. Frank Wilson is now at Pioche after mining and general supplies.

Pioche District.

PIOCHE CONSOLIDATED.—Record, May 18: Mr. John Longmaid, who was here for several weeks two months ago, looking over the various properties of the Pioche Con. Co., with a view of leasing a portion of them, writes Geo. C. Blanchard that Mr. John Claflin, for the company, declined to lease all or any considerable portion of the property, which refusal is based on the expectation that the railroad will soon be built here.

POORMAN MINE.—Messrs. Swindler and Lloyd have secured a year's extension of their lease on the Poorman mine, just east of town, from John C. Eames. Early in the week an important

strike was made in the claim through the east drift from the new working shaft. The ledge opened with a foot or more of high-grade chloride ore, the cbute pitching northwest and southwest. This, at a vertical depth of 150 feet, will give about 200 feet on the vein, with virgin ground clear to the surface. The development is made east of the wagon-road, where there are no signs of ledge croppings, and it is a strike of no little importance.

Yellow Pine District.

KEYSTONE.—Pioche Record, May 18: Latest mail advices from Yellow Pine state that the purchase of the Taylor half interest in the Keystone gold claim at \$40,000 had not yet been consummated. I. C. Blake, of Denver, is the party, it will be remembered, who was expected to make the purchase. The Keystone itself, though, is reported to show up large quantities of high-grade ore, only such as was necessary for development work having been extracted since last November. The working force has not been increased, but remains at three men. Mr. Blake is in that section personally inspecting the country which his railroad is to develop and may make the purchase before closing his business there. The principal excitement in that section is at Vanderbilt district, California, which the road has now about reached. At Good Springs everything is quiet and may continue so for a time. The weather, too, is becoming oppressively warm, and claims situated any distance from water will probably receive little attention until next fall.

Tuscarora District.

NAVAJO.—Times-Review, May 19: The stopes above the 150 and 350-foot levels continue to yield about as usual.

BELLE ISLE.—South intermediate drift above the 250-foot level extended 12 feet, through a large clay break which has cut off the ledge entirely. The stopes are looking about the same.

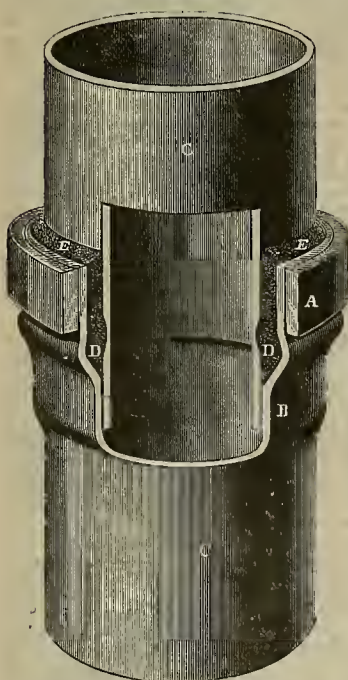
NORTH BELLE ISLE.—An upraise has been started from the south-line crosscut, south 300-foot level; progress 15 feet.

BRITISH COLUMBIA.

MORE FAVORABLE THAN EVER.—Nelson Miner, May 15: Scarcely a day goes by without adding something to the already large collection of satisfactory evidences of the vast extent and richness of the ore bodies of the entire central portion of British Columbia. That scarcely sufficient work has been done in many sections to determine the permanent nature of the mineral-bearing formations is quite true; but in every instance, when extensive development has been carried on, the results have been such as tend positively to set at rest any doubt as to the depth of the ore body. Some doubt was felt at first as to the existence of true fissures, but this has been cleared away long ago. The concensus of opinion as gathered from the best posted mining men in the country is that the fissure will be found in greater number as the developments of mining sections progress. In the meantime the extent of many of the deposits is so great as to render them even more valuable than an ordinary fissure. An example of this is to be found at Thunder Hill, where

MATHESON PATENT LOCK JOINT PIPE.

CUT SECTION.



A—Wrought Iron Ring Shrink on Pipe.
B—Bell End Pipe.
C—Body Pipe.
D—Lead Space, showing Patent Lock Joint.
E—Lead Space.

We take pleasure in calling the attention of Hydraulic Engineers and all users of Iron Pipe that we are agents for the "MATHESON LOCK JOINT LAP-WELDED PIPE," and are prepared to furnish same from stock or directly from the mills.

This pipe is of Wrought Iron and is adapted for Water Main, Gas Main, Sewer Pipe, Etc. External Diameter of either Standard Wrought Iron Pipe or Tubing can be furnished, and of any desired weight or gauge, in connection with the Matheeson Patent Lock Joint.

THE ADVANTAGES OF THIS PIPE ARE:

- SIMPLICITY IN CONSTRUCTION.**—Permitting handling without the aid of skilled labor.
- A RELIABLE JOINT.**—Whether used on light or heavy tubing.
- A SAVING IN COST** of transportation as compared with any other style of wrought or cast iron pipe.
- A SINGLE CONNECTION AT EACH JOINT.** where other kinds have a double one.

Water Gates, Hydrants, Stand Pipes and all Necessary Tools and Fittings for Complete Waterworks. Specifications furnished.

IRRIGATION PLANTS OF ALL KINDS,
INCLUDING HYDRAULIC RIVETED AND IRON PIPE, CAST IRON AND SCREWED JOINT PIPE AND FITTINGS.

WE ARE AGENTS ALSO FOR

BALL AUTOMATIC STEAM ENGINES (Pacific Coast),

HEINE PATENT SAFETY BOILERS,

IRON AND STEEL FLUMING,

DAVIDSON IMPROVED STEAM PUMPS.

JOHN H. MCGOWAN'S DUPLEX PUMPS,

BALDWINVILLE CENTRIFUGAL PUMPS,

ETC., ETC., SEND FOR CIRCULARS.

RISDON IRON WORKS.

SAN FRANCISCO, CAL.

the entire mountain is one large ore body, and the ore is taken out in benches like quarrying building stone. One thing which has rendered many old miners doubtful as to the lasting quality of the various finds is the fact that many of the ordinary conditions in this country were found to be quite different from what they had been accustomed to on the other side. To one who has been long familiar with the galenas of Colorado or Utah, the British Columbia galenas are little short of marvelous. In those places the ordinary large cube galena will run from 5 to 40 ounces in silver, seldom much higher, while the steel and spangle galenas are usually an average of 50 per cent higher value. What wonder, then, that the old-timer should shake his head doubtfully at an almost exactly opposite state of affairs, and be for a time unwilling to believe that such high-grade large cube galena could be other than isolated cases of shallow deposits. But even the most skeptical have been forced to change their opinion in face of a widening range of discoveries and added depth of development. The same is true of many other classes of ores common to this section, and, as outside capital is now awakened to these facts, it is impossible to foresee any reason why the predictions of those who know this country best should not be realized, and these predictions are that the mining interest of this region is a lusty infant destined to rapidly grow to giant strength.

UTAH.

THE OGDEN SMELTER—Salt Lake Mining Journal, May 20: J. A. Shettle, promoter and manager of the Ogden smelter enterprise, is in the city. He states that everything is progressing favorably and work will be commenced on the buildings in a short time. The plant will not be a smelter, as is the general impression, but a leaching mill. The machinery will be of the latest, with all the latest improvements, being automatic in character, so that a great saving will be made in running expenses. The capacity will be from 100 to 150 tons per day, and it is expected that most of the ore to supply the plant will come from the west and north. Mr. Shettle says representatives of Colorado capitalists are at Ogden, with a view to locating a large smelter there.

BINGHAM—A. L. Heaton, who, with Brewer & Moore, is operating the No. 10 mine at Bingham, says the shaft is now down 200 feet, and they have encountered some ore running from 25 to 30 ounces silver and 25 per cent lead. In 15 or 20 feet more they will have plenty of ore, as they will encounter the vein of the Chicago, an adjacent claim, on its dip. This vein is very rich, having produced \$500 ore in the past. The No. 10 lies just below the Brooklyn. A shipment will be made soon.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MAY 16, 1893.

- 497,393.—FAUCET FOR OIL CANS—G. W. Arper, Oakland, Cal.
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497,743.—FRUIT APPARATUS—M. S. Birdick, Alameda, Cal.
497,463.—OVERFLOW TRAP FOR BASINS, ETC.—E. L. Burgoon, Los Angeles, Cal.
497,806.—BASKET HAMPER—O. H. Carlson, S. F.
497,308.—FAULT DRAIN—C. E. Christman, The Dalles, Oregon.
497,752.—FRUIT-PITTING MACHINE—W. A. Doble, Alameda, Cal.
497,717.—TRAVELING THRASHER—G. Grattan, Stockton, Cal.
497,658.—CULTIVATOR—Harmon & McRae, Milton, Or.
497,768.—RAILWAY SNOW FLANGE—O. H. Johnson, Sisseton, S. D.
497,474.—OIL SEPARATOR—W. P. Miller, Redding, Cal.
497,746.—FARTING CANN—J. R. Phelps, S. F.
497,727.—SHIRT—C. W. Prentiss, S. F.
497,873.—ANALOGATOR—N. L. Rader, Corvallis, Or.
497,314.—WAGON ROAD—T. S. Riddle, Eugene, Or.
497,607.—ANIMAL CUN—B. Riggs Crowley, Or.
497,348.—RAFAIGATOR CAR—P. W. Ross, Los Angeles, Cal.
497,354.—FILTER—T. G. Sortor, Baker City, Or.

The following brief list by telegraph, for May 23 will appear more complete on receipt of mail advices:

- California—John T. Davis, San Francisco, treating of cocoanut husks; Stanley L. Fulford, Los Angeles, gearing for pumps; Charles S. Hamlin, Los Angeles, and metal pipe bell-lock joint; William F. Murray, San Francisco, capstan; Henry E. Poehlman, San Francisco, bumper or stop for cars of underground cable-railway crossings; Samuel D. Roberton, Undine, pipe expander; Albert J. Rogers, Santa Rosa, lubricator; Lee J. Rogers, Pomona, plumb level; Henry C. Royer, Los Angeles, electro-therapeutic apparatus; Carl L. Schallitz, San Francisco, vacuum pan; Charles O. Stallman, San Francisco, combined rotary calendar and stamp-holder; Clarence M. Wolan, San Francisco, breech-loading firearm; James W. Right, Los Angeles, fruit-tree suspender; William S. O'Brien, design for cane.

- Oregon—George F. Moffett, Portland, conduit for electric railway.
Nevada—Jerome Abbel, Reno, stump extractor.
Washington—John M. Bell, Tacoma, district telegraph return-signal key; Thomas A. Terrell, New Whatcom, stump-puller.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents also general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Share Market.

Until about Wednesday mining shares continued depressed, but on that day there was a reaction and an upward tendency was shown. Orders to buy came from Virginia City, which is always regarded as a favorable symptom. Some good news came from Cons. California and Virginia, Ophir and Potomac which helped the market out. The improvement, however, is not very marked, no great advance of any description having occurred. In another column will be found an article referring to one of the reasons for the depression in Comstock shares.

Market Reports.

The Markets.

SAN FRANCISCO, May 25, 1893.

THE METALS—Tin has developed considerable weakness during the past two days. Copper and lead are unchanged. Silver is in the same situation as for some time past.

Pig Iron.

The report of the New York Metal Exchange for May 18th, says: "The change of feeling within the past two days is very remarkable. Holders have been somewhat conservative in anticipation of a slight advance in freights from the South, but the announced schedule is a complete surprise. It is just possible that some modification may be made in view of the large contracts that are still open, but under any circumstances, those who have iron for sale, require decidedly higher figures than would have been considered a week ago. As a rule, there is a disposition to avoid quoting until the situation is more clearly developed, but some good concerns say they are open to business at fifty cents advance, others quote a still larger advance, but it is just as unlikely that buyers will pay advanced prices immediately, as that holders will continue at the old figures. Those who must buy will have to pay more money, those who can wait will wait, for the present at all events."

San Francisco Metal and Coal Market.

ANTIMONY—@ 14 English, D. @ 18
Refined, in car lots @ 78 3/4 Diamond tool @ 84
Powdered, do. @ 78 3/4 Pick & Hammer @ 10
Concentrated, do. @ 78 3/4 Machinery @ 4
All grades Johnson's advance. Tins Oils @ 4 1/2

COPPER—@ 22 Bolt, @ 22
Sheet, @ 22
Ingot, jobbing, @ 14
Do, wholesale, @ 13 1/2
Fire Box Sheets @ 24
Do, 14x20, spot, @ 5 87 1/2
Do, 14x20, @ 5 87 1/2
Do, 14x20, @ 5 87 1/2

IRON—@ 3 Pig, base, @ 3
Norway, base, @ 3
FIN IRON. @ 3

STEEL—@ 18 English, D. @ 18
Canton tool, @ 84
3/4" Diamond tool @ 84
Pick & Hammer @ 10
Machinery @ 4
Tins Oils @ 4 1/2

TINPLATE—@ 22 Bolt, @ 22
Sheet, @ 22
Ingot, jobbing, @ 14
Do, wholesale, @ 13 1/2
Fire Box Sheets @ 24
Do, 14x20, spot, @ 5 87 1/2
Do, 14x20, @ 5 87 1/2
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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVIED.	DELINQ.	TAXES & SALE.	SECRETARY.
Alta Cons M Co, Utah.....	100	10	10	10	J. H. Cripps, Salt Lake City
Alpha Cons M Co, Nevada.....	100	10	10	10	E. Elliott, 303 Montgomery
Alma M Co, Nev.....	100	10	10	10	L. Osborn, 303 Montgomery
Big Hole Placer M Co, Utah.....	100	10	10	10	J. Medley, Salt Lake City
Bullion M Co, Nevada.....	100	10	10	10	R. R. Grayson, 331 Pine
Chollar M Co, Nevada.....	100	10	10	10	O. E. Elliot, 303 Montgomery
Cons New York M Co, Nevada.....	100	10	10	10	C. E. Elliot, 303 Montgomery
Cons St. Gothard M Co, California.....	100	10	10	10	C. E. Elliot, 303 Montgomery
Eclipse M Co, California.....	100	10	10	10	C. T. Menden, 216 Bush
Evening Star M Co, California.....	100	10	10	10	J. J. Sullivan, 320 Sansome
Gould & Curry M Co, Nev.....	100	10	10	10	A. D. Burrows, 303 Montgomery
Gray Eagle M Co, Cal.....	100	10	10	10	C. G. Hursey, 303 Montgomery
Iron Marble Co, Cal.....	100	10	10	10	W. W. Sargent, Mills Bldg
Jack Rabbit M & Co, Nevada.....	100	10	10	10	T. Wetzel, 320 Sansome
Lad M Co, Nevada.....	100	10	10	10	R. E. Kelly, 303 Montgomery
Lady Washington Cons M Co, Nevada.....	100	10	10	10	L. Osborn, 303 Montgomery
North Belle Isle M Co, Nevada.....	100	10	10	10	J. W. F. 310 Pine
Overman M Co, Nevada.....	100	10	10	10	G. D. Edwards, 414 California
Shiloh Cons M Co, California.....	100	10	10	10	E. F. Stone, 303 Pine
Valenzuela M Co, Mexico.....	100	10	10	10	A. E. Gray, 421 California

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Alta Cons M Co, Alaska.....	Annual.	A. T. Corbett, Mills Bldg.	June 21
Gold Hill M Co, Nevada.....	Annual.	C. A. Grow, Mills Bldg.	June 21

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California.....	100	L. Osborn, 303 Montgomery	Oct 30
Champion M Co, California.....	100	T. Wetzel, 310 Pine	May 15
Cons New York M Co, Nevada.....	100	C. E. Elliot, 303 Montgomery	Feb 15
Cons Western Quicksilver M Co.....	100	A. Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California.....	100	D. M. Kelly, 320 Pine	May 18
Pacific Coast Borax Co, California.....	100	A. H. Clough, 230 Montgomery	May 18
Standard Cons M Co, California.....	100	J. W. F. 310 Pine	Dec 23

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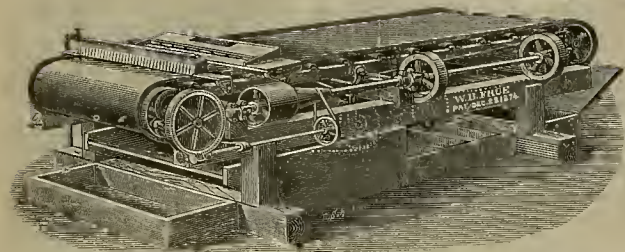
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FRUE ORE CONCENTRATOR

OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



Price of 4-foot wide Plain Belt Frue Vanner..... \$550, f. o. b.
 " " " Improved Belt Frue Vanner 800, f. o. b.
 " 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

SAN JACINTO ESTATE, LIMITED,

Office of General Manager,
 P. O. Address, South Riverside, San Bernardino Co., Cal.
 CALICO, Dec. 18, 1891.

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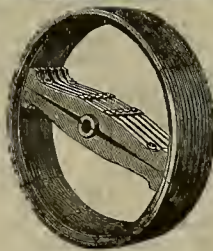
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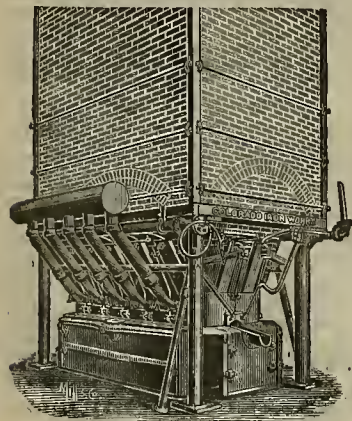
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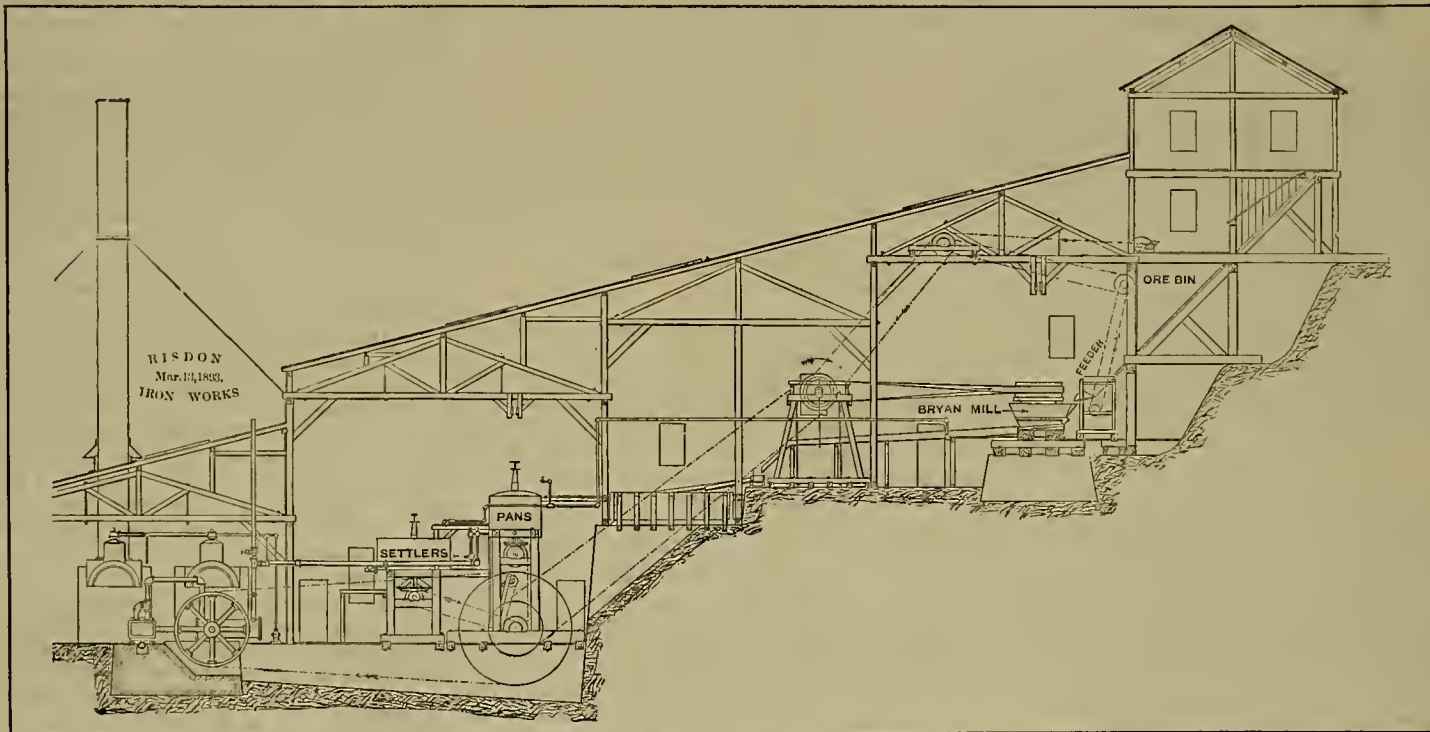
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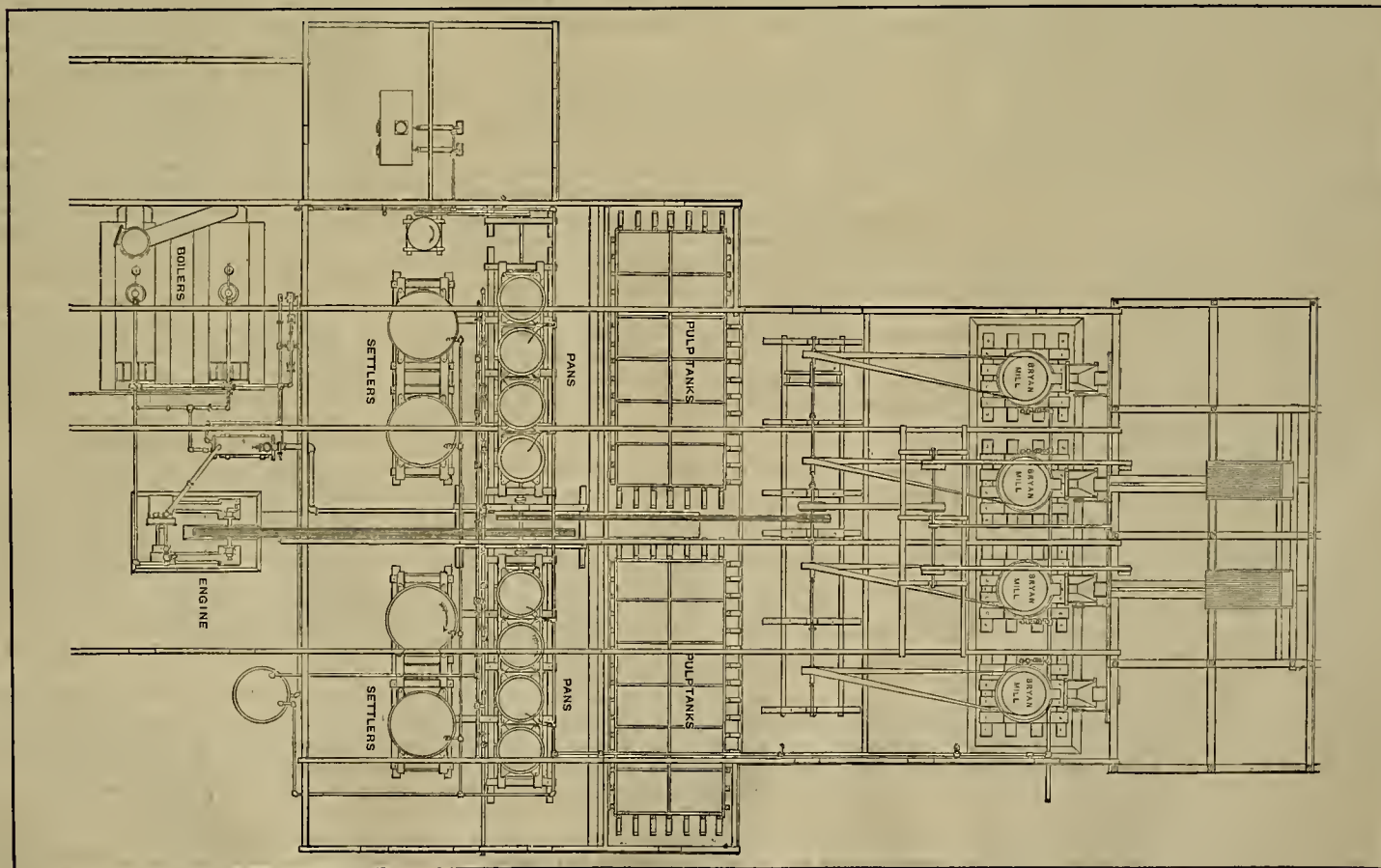
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ELEVATION OF SANTA EDUWIGES AMALGAMATING SILVER MILL, CHIHUAHUA, MEXICO.



PLANT OF BRYAN ROLLER MILLS, SANTA EDUWIGES MINE. (PLAN) (See page 339.)

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San Francisco, June 3, 1893.

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Comment.

In accordance with the orders of the Secretary of the Navy, Rear Admiral John Benham is to command the North Atlantic squadron, and have the San Francisco as her flagship, and the Philadelphia will take her place as flagship on the Pacific Station. We were at first rather inclined to resent the retention of the San Francisco on the Eastern Coast, hoping to have her return to this station where she was built. But she will now stand as a good advertisement of the Pacific Coast shipbuilders and we can afford to spare her, especially if she brings us more orders from the Government. The San Francisco was admitted by all to be the finest looking craft in the recent international naval review and made the best appearance of any craft there. She has also made a fine record as her sea service in the voyage to the East. The Union Iron Works people ought to be proud of the ship and so should the city after which she is named. As flagship of the North Atlantic squadron she will be seen by thousands where she would be seen by hundreds here. Her name will naturally bring forward the fact that she was built here, and her record and appearance will serve a good turn for the Pacific Coast ship-builders.

Mr. John Birkinbine in his presidential address at Montreal before the American Institute of Mining Engineers, discussed the development of technical societies in the United States, and the methods of presenting and publishing technical papers. Mr. Birkinbine says that the discussions which follow the presentation of the majority of these papers are often more valuable than the papers themselves. As a rule they bring out information from personal experience that the original does not contain, and that would only come to light as a discussion by some one who may be a careful observer but lacks the time or inclination to write out what he knows. Some papers do not invite discussion, by reason of their mathematical or other technical form; but these papers should never be read, except in abstract, at a congress or meeting of engineers. They consume valuable time, shut off discussion on more generally interesting papers, cannot be readily digested, and are, in fact, a nuisance to the enforced listeners. The practice now prevailing in a number of technical societies, of printing paper in advance, or at least an abstract of it, is to be commended. It was a happy thought of Mr. Birkinbine to bring this question to the attention of so influential a body as the American Institute of Mining Engineers. Long technical papers, read before a general meeting, and without discussion, are generally wearisome, however valuable the facts presented. There is no opportunity to digest the statements. People would much prefer to have the matter in printed form. It has seemed necessary, however, to read these papers at open meetings, which is one reason that the at-

tendance is generally small at local technical societies. The members know the paper will be ultimately printed and they can read it at their leisure. If, however, they have all read it and a discussion is in order the members will come to the meeting ready to join in it. Printing the papers in advance seems to us the best way, for the meetings of societies are then much more attractive, and when the full proceedings are printed the discussion can accompany the paper.

There is not much chance for the sulphur mines of this State, Nevada and Utah to prove very profitable in view of the imports from Japan and Sicily. The Sicilian producers have been having hard times lately owing to low prices, over production and competition. Three-fourths of the proprietors of the sulphur mines of Sicily lately met and resolved to establish a general syndicate to control the output and sale of the material. The United States is the largest consumer of Sicilian sulphur, taking about 100,000 tons a year. San Francisco uses no more of it, our supply coming from Japan. This amounts to about 8,000 tons a year. The only sulphur deposits now being worked in this country are in Louisiana and Utah. The Cove Creek sulphur beds in Beaver County, Utah, produced about 1200 tons of sulphur in 1891, but new machinery has been put in and its output will be increased. Mining is being carried on by open cuts from 18 to 20 feet deep. The sulphur is extracted from the ore by steam heating in an airtight retort. It is then molded into rolls or blocks convenient for shipping, or ground at the mill for making sheep dip and other preparations. Works of this kind were formerly in operation at the Sulphur Banks in this State, but there is no profit in the business in view of the cheap supplies from Japan.

A few weeks ago the Australasian Institute of Mining Engineers was formerly organized at Adelaide. The avowed objects of the institute are: "To promote the arts and sciences connected with the economical production of the useful minerals and metals, and the welfare of those employed in these industries, by means of meetings for professional papers, and to circulate by means of publications among its members and associates the information thus obtained." This is another advanced step among the professional mining engineers. For a great many years the members of this profession kept their knowledge to themselves as a "stock in trade," and some of them stick to that principle still. However, the majority think differently now and are willing to publish their experience. The American Institute of Mining Engineers is now one of the largest and most influential organizations of the kind in this country, and a great many professional papers are published by the members. When we have added to these the papers which will come from the Australasian Institute, the literature of mining engineering will be greatly enriched.

The Monterey had her sea-trial this week, and, somewhat contrary to expectations, proved a good sea boat. Of course the water washed over her low decks, but that was to be expected. She was more buoyant, however, than was anticipated. The great guns were fired when loaded with projectiles. The accounts of the correspondents who were aboard differ materially as to the results of the firing. One says everything was successful, while another says the Monterey as a fighter was a failure because some defects were found in the gun fittings and turrets. It is probable, however, that any minor defects can easily be remedied now that they are known, and they could not well be known until after practical tests. The official account of the test will not be made public until it has reached Washington. The boilers, about which there has been so much foolish talk, worked in a perfectly satisfactory manner.

Nevada has no State building at the World's Fair, but her exhibit is praised. In the mining department she is said to be making a good show. We do not hear many compliments of our California mineral exhibit; in fact, the remarks about it are the reverse. Here is what the correspondent of the Sacramento *Bee* says about it this week: "Go into the Mining Building, and what do we see? States that make no pretenses whatever of great mineral resources are making a showing that puts California to shame. Yes; California, the Golden West, famed in song and story for her wondrous wealth of mineral stores, has nothing to show. Then go to the California Building and take a look at her mineral display made there—a few la-de-da specimens in pill-boxes. Pass over to any other State building that attempts anything of the kind, and what do you see? A display that makes your head swim—tons and tons of ores exhibited on tables, in sacks, in crates, in truck and carload lots, making you realize immediately that they have the minerals and can show them." Of course this State could have excelled them all had one

been properly prepared. To have arranged something unique and striking would have required brains and to have carried out the arrangement satisfactorily would have required energy. Neither brains nor energy seem to have been put into the California mineral display, though about \$15,000 was set aside for it. This is very unfortunate indeed for the State, which needs outside capital to aid the mining industry. A poor showing, compared with other States, will do us more harm than if we had made no mineral exhibit whatever.

Contesting Legal Hydraulic Mining.

In an editorial paragraph recently, referring to injunctions on hydraulic mines by the Anti-Debris Association, we said: "The miners' time will come, however, and only a little patience is needed. When the Government Commission is organized a license to mine may be procured readily in most of these instances and then operations may be resumed without reference to the Anti-Debris Association or its spies." To this the *Sutter Independent* takes exception and begs to inform the MINING AND SCIENTIFIC PRESS that it is entirely mistaken. It recommends to the PRESS and its clientele a careful reading of those sections of the Caminetti law which govern the matter of petition to the Commission, notice to parties interested, hearing of contents, appeals, etc., and then asks us if we can "do anything without reference to the Anti-Debris Association." Our answer is "certainly, the miners can go on without any reference to the Anti-Debris Association," just as we first maintained. Our statement was that when a license to mine was issued the miners could go on. All the contests, etc., if any are made, must be commenced prior to the issuance of the license, but when once issued, the miners are amenable to the Government Commission alone.

The Debris Commission is compelled to publish the petition of the miner, and all parties interested, either as petitioners or contestants, whether miners or agriculturists, may file affidavits, plans and maps in support of their respective claims. If the Commission decide in favor of the petitioner, they then specify in detail the kind of impounding works necessary (having previously visited the mine). The petitioners must then present plans and specifications, and if these are found to meet the requirements, permission shall be granted to the owners of the mine to commence operations.

The Anti-Debris Association can of course make a contest in every case where a petition is filed, and doubtless will, if it pursues its usual policy. And it will have its hands fuller than it ever did before when it undertakes this job, too. Mr. W. T. Phipps, the manager of the association, tells the taxpayers of the counties from whom he derives his salary that "this Debris Commission will, in the future, be to us what the courts have been in the past, and if we wish full protection before that body we must be in a position at all times to present necessary facts, upon which that body shall act—at least for some years yet to come, until the commissioners shall become fully conversant with all the details of our claim. Hence you see the necessity of maintaining an organization who shall make this work of getting proofs its business."

It is evident from these remarks of the *Independent* and of Mr. Phipps that the Anti-Debris Association intends to continue its policy of obstruction whether the miners try to obey the laws or not. Now, no one can find fault with them for obstructing, arresting and punishing those who mine illegally, but when the miners endeavor to comply with the law a policy of constant obstruction can only end in defeat. A law has been made by Congress by which the hydraulic miners can pursue their avocations under certain specified restrictions, and the more recent decisions of the courts are on the same line. Those miners who honestly endeavor to comply with the provisions will be protected by the courts and the Commission.

It is our opinion, too, that Mr. Phipps will find himself mistaken with regard to the Commission being to the Anti-Debris Association what the courts have been. This Commission will treat the matter from an engineering standpoint altogether and not make decisions on legal technicalities or local prejudice. The law compels them to examine each individual mine from which a petition is received, and they will therefore have a more intelligent knowledge than court officials who never saw the properties in dispute.

Moreover, this subject of hydraulic mining, debris, and river protection has passed from the domain of law into that of engineering. The legal features have been decided; the engineering problems are still to be solved. The Commission which has the matter in hand is to do its work under a special Act of Congress, and its duties as specified are such as require engineering, not legal, knowledge. If they find that a mine can be operated without injuring the navigable streams, after examination and consideration of all the circumstances, they will issue a license. They are

not a class of men to let prejudice, malice, or technicalities, influence them in any way. If they think the mine is in a situation where it cannot be operated without doing harm, they will issue no license.

In the decision of the matter from an engineering standpoint, the miners will have an advantage which they have not had before the courts in the past. Every claim must be visited by the engineers or their assistants, and every claim will have its particular situations and surroundings examined. There will be no general decision as to right to mine or stoppage of mining. The MINING AND SCIENTIFIC PRESS has never upheld those men who have injured the hydraulic mining industry by violating injunctions or breaking the laws, but it does believe that hundreds of hydraulic mines could have been at work all these years if it were possible for fanaticism to listen to reason. It believes, too, that under the provisions of the Oaminetti Act the hydraulic mining industry in California will be rehabilitated in due time, notwithstanding the obstructive efforts of individuals as opposing associations.

Working South Africa Gold Mines.

The Witwatersrand district, Johannesburg, South Africa, continues to turn out great quantities of gold. The latest complete returns are those for March. Forty-seven companies milled in that month 117,291 tons of ore with 1789 stamps during twenty-seven days milling. This was equal to 3.65 tons per stamp per day. The total yield of gold from the milling was 84,235 ounces valued at £304,516. Concentrates yielded 5460 ounces valued at £21,809. In two cases the concentrates were worked by MacArthur-Forrest process and the other three cases chlorination process was used. In working tailings one mine used the Molloy process, one chlorination, one "cyanide" and eighteen used the MacArthur-Forrest process. The total tailings worked in the month yielded 13,877 ounces valued at £62,021. From alluvial workings 200 ounces were obtained valued at £680 and from other sources 2699 ounces were obtained valued at \$9447. The total yield of the camp for the month of March was 111,474 ounces of gold valued at £398,473. The value of gold is generally about £3 10s per ounce. The biggest mines are all using the MacArthur-Forrest process. The new Primrose, for instance, which milled 10,800 tons of ore, worked 17,500 tons of tailings by this process. The total yield for the month was 7336 ounces worth £24,940. The Robinson which worked 8201 tons in the mill and took out £32,632 got £11,084 from its tailings. The Langlaagte estate which worked 19,120 tons at its mill also worked 11,024 tons by the MacArthur-Forrest process. The Durban Roodepoort mine, which milled 6750 tons, worked 8100 tons of tailings. The Crown Reef, which milled 9744 tons, worked 8308 tons of tailings. With three exceptions all the mines on the list which were working over their tailings are using the MacArthur-Forrest process to recover the gold.

The camp of Witwatersrand is now turning out more gold annually than the whole State of California and is, for the present, the leading gold producing section of the world. The material from which the gold is obtained is a conglomerate, like a cemented gravel, and is not quartz like we have in our ledges here. It is very hard and has to be crushed in mills just like quartz. The gold is not of a very high grade, in fact some of it is very poor as compared with what we find here.

A Silver Mill for a Mexican Mine.

The engravings on our first page show a plan and elevation of a new pan-amalgamating silver mill, constructed by the Risdon Iron Works for the Tabor mines and Mills Company, Santa Eduwiges mines, in the Jesus Maria District, Chihuahua, Mexico. It corresponds in nearly all respects to a very successful mill recently built by the same company for the Candelaria mines, San Dimas, Durango, Mexico. The new mill has a capacity of treating from 60 to 100 tons of ore daily, and except the Candelaria mines, which has the same capacity, is the largest installation of the Bryan roller mills for crushing that the company have erected.

The motive power consists of a compound Corliss engine with cylinders 12 and 20 inches diameter, 22 inches stroke, sufficient for four 4-foot Bryan mills, eight 5-foot pans, and four 8-foot settlers, with other details of the mill requiring power. The boilers, two in number, are tubular, 54 inches diameter, 16 feet long.

The Bryan roller quartz mills, which have been described in the MINING AND SCIENTIFIC PRESS, are a main feature of the plants named. More than fifty plants have been supplied with these mills, with uniform success. The following, from the company's circular, will furnish the main points in respect to the advantages of this method of crushing:

"The old arrastre which probably was used dearlier than

stamps, is still in use in its crude form, and in many instances considered superior to new and improved machinery. The arrastre 'did the work' and did it well—and so did the Obilian mill, which may be considered developed from the arrastre. But greater capacity was required, and as the stamp battery at that time was the only machine arranged for continuous crushing, it took the lead, as its capacity was so much greater. As for amalgamation, the principle of the arrastre and Chilian mills was considered superior to stamps. Many different kinds of roller mills were tried, but they were too complicated and difficult to keep in repair, and the oil could not be prevented from dropping into the pulp, which made the quicksilver unable to amalgamate with the gold. It was after many years of experimenting, and at considerable expense, that the Risdon Iron Works were able to so improve these machines that they now have all the advantages of the crude arrastre and Chile mill, and at the same time possess the simplicity and durability that is required in mining machinery."

These mills are driven by a direct band without gearing. The drawings of the complete plant are clear and require no detailed description. At the Candelaria mill, one man, a common laborer, attends the whole crushing plant, which reduces from 60 to 100 tons of ore daily.

A Company For Selling Mines.

In another column will be found a copy of the articles of incorporation of a company which proposes to handle mining properties on a plan which looks as if it were a good one for the mine-owners and purchasers. The incorporators are all men of standing in the community and of practical experience in mining affairs. They intend to act as agent for eastern and foreign mine-owners and will have correspondents in New York, Chicago, London, Paris, Berlin and other cities. The main feature of the organization is that which provides for assisting miners and prospectors to dispose of properties without their being over-loaded by middle-men, and mines will be advertised for sale just as real estate is offered. The policy is this, when a man comes in and reports a mine to be worth \$40,000 and wishes to list the same with the company, it will send one of its experts out to verify his statement. If verified the company will offer his mine for sale at his own figure and charge him a commission for selling. This enables the buyer to get a mine at bed-rock figures, and the seller at the same time gets his price less the commission of course, which will be agreed upon.

Several attempts have been made at various times to establish mining bureaus, mining agencies, etc., for the sale of mines, but none have been successful either because the originators were irresponsible and took any property that came along, or because they were mere middle-men working under a company's name. They have not guaranteed the statements made by the would-be sellers or taken steps to verify reports. As we understand it, this new organization will first satisfy itself, through its experts, of the value of the property and then offer it for sale. It is only intended to handle legitimate mining properties which have some prospective merit.

Another feature will be furnishing information to non-residents concerning properties in which they are interested. That is, they will obtain information in regard to mines and impart this on receipt of a fee. It will have nothing to do with mining stocks one way or another, legitimate mining being its only sphere. From its articles of incorporation the company itself is prohibited from purchasing as a corporation any mining property which is offered to it for sale. This is a provision which no similar organization has had, and it is an important one, confining the company to its legitimate functions as an agent. The incorporators of the new company are: Irwin C. Stump, Irving M. Scott, J. H. Neff, W. F. Goad, R. C. Chambers, P. N. Lilienthal and D. M. Burns. The secretary of the company is to be Wm. C. Ralston. Offices are to be taken in the Mills Building and the company will shortly be ready for business.

BRITISH COLUMBIA HYDRAULIC MINES.—W. C. Ralston, the mining engineer, received a letter recently from J. B. Hobson, who is mining for some of the Canadian Pacific Railway people in British Columbia, stating that he would leave on the 20th of May for the Horse Fly Country in British Columbia to commence the work of equipping the Discovery mine for hydraulic mining. They will use 2000 miners' inches of water brought to the mine through ditches and flumes only ten miles in length. At the mine they will use 11,000 feet of 30-inch steel pipe, 3000 feet of 22-inch and 2000 feet of 18-inch and 3 No. 7 giants. The gravel bank averages 100 feet high and is claimed to be worth 20 cents per cubic yard.

What a wonderful change it would make in California if it were possible to operate hydraulic mines again without restriction and without injuring the navigable rivers.

Coast Industrial Notes.

FROM Santa Cruz to Santa Barbara this coast abounds in crawfish and arrangements are being made to catch them in quantities. Some will be sent East alive in cars, some will be sent cooked and some spiced in vinegar. A factory will be established in Santa Barbara county.

The new machinery at the Bay City mine, El Dorado county, between Enterprise and Plymouth, has been erected, and was to be started this week. It was put up for the purpose of sinking the shaft to the depth of about 1000 feet, for which the machinery previously in use was inadequate.

THE new steamer Weecott, which has just been built at the Oakland shipyard, has been brought to Vallejo-street wharf to be fitted up. The Weecott will have an electric plant and other modern appliances. The vessel is 130 feet long and has a beam of 29 feet. It will be in charge of Captain Yarnberg, and will run between this city and Eel river. The Weecott is the property of Russ, Sanders & Co.

TRACK-LAYING for the new Mission-street electric road has been completed to Seventh street, and in about four weeks the road-builders will reach the ferries and finish track-laying. The Twenty-ninth-street branch, from Mission to Noe street, is nearly finished, the ties and rails already being in, and the macadamizing the roadway almost completed on the portions required to be paved by the railroad company.

AT the present time 2178 men are directly engaged in the labor of catching and canning salmon at Astoria, Oregon. Of these 175 are working on the fish traps, 1300 are gill-net fishermen, working in fishboats, and the balance—703—are employed in canneries cutting, filling, slicing and cleaning the fish, and canning, soldering and packing the tins. Among the latter are 640 Chinamen, who constitute the entire number of Mongolians employed in the business. There are 650 boats employed.

THE West Coast Furniture Company of this city which employs from 300 to 400 men have decided to make a ten per cent. reduction in the wages of the mill hands. The decision affects about 75 men who refuse to consider the proposition. The owners of the mill, L. & E. Emanuel, say that unless the hands accept the situation they will have to shut down until business revives, as the furniture manufacturing industry is exceedingly dull at present. The men threaten to place the matter before the Federated Trades.

THE fishing schooner St. Lawrence, Captain T. A. Green, arrived at Ainsworth & Dunn's dock, Seattle, the other day with about 40,000 pounds of halibut. This is the third successful fishing trip of this schooner since she was built, and the present catch is the most valuable of the three. Captain Green says he did not intend to go farther than Flattery banks, as heretofore they have been able to get halibut there by the first of May; but after waiting five or six days there and catching on six or seven fish, he went again to the Northern banks and the fish brought in was all caught in two days.

ARTICLES of incorporation of the Southern California Manufacturing Company with the principal place of business at Pomona, have been filed in San Bernardino county. The capital stock is placed at \$50,000. The directors are: John H. Dale, C. E. White, H. P. Wilkinson, John E. Packard and James H. Todd. The company will derive its power from the San Antonio Electric Light Company and from the new plant now being erected on Mill creek, near Redlands. It is estimated that these sources will supply several thousand horse-power for manufacturing purposes in the day time and for lighting Redlands and San Bernardino and other cities at night.

SAN DIEGO fishing interests are on the increase. In 1889, San Diego shipped by the Pacific Coast Steamship Company alone 388,370 pounds of fish; in 1890, 463,360; in 1891, 467,260, and in 1892, 566,360 pounds. Up to 1891 there had never been a pound of fish pickled in brine shipped out of San Diego. In October, November and December they pickled and shipped 5260 pounds as a flyer or experiment. It proved so successful that in 1892 they pickled and shipped 124,900 pounds. How is that for an increase in twelve months? At present barracuda are running in large numbers and the catch is very heavy. Mackerel are also coming in and the catch promises to be unusually large. The albacore we have always with us on the banks about ten or fifteen miles out.

J. J. MOSTON and Mr. T. HAMMER have a force of men at work constructing a mining ditch from a point one and a half miles from the mouth of Grouse creek to the mouth of the South Fork of the Trinity river, 35 miles from Blue Lake, Humboldt county. Some time ago Mr. Moston sold a half-interest in this mining property to Mr. J. L. Kellison, and while they are likely to dispose of it at any time to a syndicate of capitalists, it is, nevertheless, among the probabilities that they will retain it until the ditch they have undertaken shall be completed and they are ready to work the extensive beds of gravel its construction will make easy. The Blue Lake Advocate is assured that an abundance of water, which this ditch will provide, will render possible the working of 1280 acres of gravel. The first of these beds lies at a point four miles from where the ditch begins, and they are scattered along the entire eighteen miles of country that it will traverse. There are a number of good mines in that section, Mr. Moston says. Among them may be mentioned Mr. A. N. Foote's claim, situated on Trinity above the mouth of Willow creek; the Russell mine, below the mouth of Willow creek on Trinity; the Arcata claim, owned by Mr. T. E. Knight and other Arcata parties; the "Poor Man's Friend," a Trinity mine one and one-half miles above the mouth of Willow creek; and the Dungan mine, situated perhaps one and a half miles above the Foote claim. Of these the "Poor Man's Friend" is a valuable property, and so is the Dungan mine which, as Mr. Moston expresses it, wants only water upon it so that the gold that is assuredly there in large quantities may be taken out.

The Mines of Southern Oregon.

[From our Special Correspondent.]

TO THE EDITOR:—The mines of southern Oregon, which in the past have been but little known and talked of outside of their own locality, are now attracting considerable attention among prospectors and capitalists all over the Pacific coast. This is all owing to a few energetic men, both capitalists and prospectors, who were not afraid to back their judgment with unremitting labor and capital. It has been the popular belief among mining men for years that southern Oregon contained no standard mines of any importance, but the development of the Ashland mine and others proves the incorrectness of this belief. Although they have some good mines in southern Oregon and more are being developed, still it does not compare favorably with the quartz mining districts of California, in regards to richness and extent of ledges.

The geological formation of the mineral belt in Josephine and Jackson counties, taken as a whole, is of a pockety nature and the mineral bearing ledges small and irregular in width, as a general rule. Porphyry, strongly impregnated with iron and lime, is predominant throughout the formation of the mineral belt, although in some localities every class of formation existing in the mineral belts of the coast may be found all mixed up together showing evidence of simultaneous upheavals of the earth's crust at some remote period in those localities. Those spots, so to speak, occur principally in the northern portion of Jackson county and the southwestern part of Josephine, and are productive in small pockets which seldom exceed a few hundred dollars, with the exception of some late discoveries. There have only been two large pockets discovered so far in southern Oregon, viz: Gold Hill and Steamboat, and it is the current belief among prospectors and miners that where there are one or two large pockets such as there were found, there must certainly be more, yet undiscovered.

Gold Hill produced over \$129,000 while Steamboat yielded in the neighborhood of \$246,000, as near as can be learned from the most reliable authority, and although some 20 miles apart, yet they were both discovered in this mixed formation. Within the last few months several good pockets have been discovered in Jackson county in what is known as the Blackwell hills between Gold Hill and Jacksonville, but the largest, amounting to something over \$4000, was discovered by Mr. D. Horn, on Galls creek, about four miles from Rock Point.

Among the energetic capitalists who are expending money to prove whether the ledges go down to any great depth or not and still carry gold in paying quantities, are the Schieffelin Bros., well known in mining circles in connection with the Tombstone mines of Arizona. They are operating on Foot's creek some ten miles from Gold Hill.

Ashland is at present the center of attraction for mining men and prospectors. Some very good prospects are being developed at present in that vicinity which promise to become good-paying properties and quite an active boom in mining is the result. The formation in this district is favorable for permanent gold-bearing ledges, and no doubt this district will attract considerable attention from capitalists in the future. The placer mines of southern Oregon were rich when worked in the early days, and wherever rich placer mines existed over a large scope of territory, good quartz mines have been developed afterward, as a general rule. The prospector who is unacquainted with this country will find a difficulty in prospecting here that he does not meet with further south.

On the north side of the Siskiyou range the country seems older and more broken and the formation covered with a greater depth of soil than it is on the south side of the mountains, which makes it difficult to prospect in, but the greatest obstacle that the prospector will find in his way is slides. In this broken up formation innumerable slides have occurred at some remote period and moved parts of the formation and ledges with them intact, covering the formation underneath sometimes to the depth of 50 feet or more which makes prospecting in such localities slow and expensive. But in the course of a few years capital combined with improved methods will overcome this difficulty and uncover the blind ledges and make to them yield up their store of mineral treasure. ALEX. QUARTZ.

Ashland, O., May 27, 1893.

Money Spent in Fighting the Miners.

TO THE EDITOR:—As the question of debris is once more before the public, it would be interesting to your readers to know how much money has been contributed by the various counties towards paying attorneys, officers and spies of the Anti-Debris Association.

From reliable sources it is learned that the Board of Supervisors of Sacramento county paid to that association \$80,000, Sutter county paid \$75,000, Yuba county \$65,000, San Joaquin county \$11,000, Colusa county \$10,000, Yolo county \$10,000 and Butte county \$4,000, making a total of \$254,000 from seven counties. To this must be added nearly \$100,000 which was contributed by individuals, and also \$40,000 which was appropriated by Congress to prosecute the miners, making a total of \$394,000. The question naturally follows: What has been done with this money? If an accounting were in order, to whom do they account?

A SUBSCRIBER.

The Mexican Export Tax on Metals.

The Treasury Department has issued a ruling to the effect that gold and silver ores, in their natural state, that is, ores which have not been subjected to any chemical process altering their natural composition, shall not be subject to the assay dues on their exportation.

This reverses the ruling of Feb. 25th, 1892, which has been felt as a severe hardship by the mining interest, and which imposed a tax on ores exported in a pulverized state, whether occurring so naturally or reduced to that state by treatment in the mill.

The new ruling declares explicitly that ore will be held to

be in its natural condition, and therefore will not be taxed on its exportation, even after it has been triturated or subjected to other mechanical process, provided it has not been treated chemically. If it has been so treated it will be subject to the export tax.

The decree, furthermore, provides that if silver in slag, precipitates, amalgams, sulphides, chlorides, or other artificial form, be found mixed with the ore in its natural state, the export tax shall be levied with respect to the whole shipment, including the natural ore, and the fines created by the Tariff for cases of fraud shall be enforced.—The Mexican Financier.

The Pacific Mining Agency and Trust Company.

The articles of incorporation of the Pacific Mining Agency and Trust Company, dated May 25, 1893, are as follows:

Know all men by these presents:—That we, the undersigned, a majority of whom are citizens and residents of the State of California, have this day voluntarily associated ourselves together, for the purpose of forming a corporation under the laws of the State of California.

First:—That the name of said corporation is the "Pacific Mining Agency and Trust Company."

Second:—That the purposes for which it is formed are: To buy and sell mines, mining claims, water and ditch properties and water-rights on commission; to act as agent and broker for the sale and purchase of mines, mining claims, water and ditch properties and water-rights; to act as agent, broker or factor for the owner or owners of mines, mining properties, water and ditch properties and water rights, to obtain, acquire and secure information of every kind relating to the merits, value and titles to mines, mining claims, water and ditch properties and water rights; and to trade and deal in and with such information, and generally to do or perform any other act or thing necessary or proper for the carrying out the purposes herein mentioned; but said corporation shall not engage in the business of buying or selling mines, mining properties, water or ditch properties or water rights except on commission, or as the agent or broker or factor of others.

Third:—That the place where its principal business is to be transacted shall be the City and County of San Francisco, State of California.

Fourth:—That the term for which it is to exist is fifty years from and after the date of its incorporation.

Fifth:—That the number of directors or trustees of said corporation shall be seven and the names and residences of those who are appointed for the first year are: Irwin C. Stump, San Francisco; Irving M. Scott, San Francisco; Jacob H. Neff, Placer County; W. F. Goad, San Francisco; R. C. Chambers, Salt Lake City; P. N. Lillenthal, San Francisco; D. M. Burns, San Francisco.

Sixth:—That the amount of capital stock of said corporation is \$250,000, and the number of shares into which it is divided is 2500 of the par value of \$100 each.

Seventh:—That the amount of said capital stock which has been actually subscribed is \$3500 and the following are the names of the persons by whom the same has been subscribed, to wit: Irwin C. Stump, 5 shares, \$500; Irving M. Scott, 5 shares, \$500; Jacob H. Neff, 5 shares, \$500; W. F. Goad, 5 shares, \$500; R. C. Chambers, 5 shares, \$500; P. N. Lillenthal, 5 shares, \$500; D. M. Burns, 5 shares, \$500.

Should Give Assistance.

The silver mine owners of Colorado, Nevada, Idaho and Montana are trying to play the part of cunning sharps; they know the question of free coinage is of greater importance to the masses than to themselves and as a result refuse to donate anything substantial toward carrying on the fight. Right here in Colorado we know of thirty mine owners who absolutely refuse to extend a single cent to the silver committee, preferring to let their ore stay underground until poverty squeezes the farmers and mechanics into making the fight so hot that free coinage is granted.

It is unfair, and if it wasn't for injuring merchants, farmers, manufacturers and mechanics we would drop the silver fight right here and let the stingy mine owners fight for themselves. There are 1000 mine owners in the silver States who could well afford to put up \$10,000 apiece to aid the silver fight (with an absolute guarantee that their money would come back to them in two or three years) and not feel the loss a bit, but they gig back their big arm-chairs and selfishly remark: "Oh, it is no skin off our nose! Our ore is in the ground and it will not run away. We can afford to wait. You fellows must have free silver or go to the wall."

Ah! that may be so, but there is just the possible chance the people will consent to a paper inflation equal to the amount that would arise through remonetization of silver. Then, Mr. Mine Owner, where would you be?

In the battle to right the crime of 1873 mine owners should do their part. They are not doing it now, not by a long way.—The Road.

An Important Mining Decision.

Not a great many suits for trespass with damages asked in the sum of \$2,000,000 have been tried in this country. The jury in a trial before Judge Knowles in the United States Circuit Court at Helena last week found for the defendant in the suit of the St. Louis Mining Company, against the Montana Company, limited, for the wrongful extraction of ores. The defendant company is commonly known as the "Drum Lummon," and has paid its stockholders, mostly Englishmen, several millions in dividends. The plaintiff company is owned by Montana and St. Louis people. Their properties adjoin and are located at Marysville, a few miles north of Helena.

Preparations for the trial have been going on for six years, the contention being that the apex of the Drum Lummon vein was within the side lines of the St. Louis

claim, which under the United States statutes, the St. Louis Company was entitled to follow. The defense was that the alleged vein in the St. Louis claim was not a vein.

Ten mining experts and geologists have been in attendance since April 24th. Their charges have aggregated about \$3000 per day for the time spent in examining the mines. Three stenographers have averaged \$50 daily each during the trial. Add to these the necessary court expenses for a trial lasting thirty days and a total of \$100,000 is reached, exclusive of attorney's fees. The experts for the plaintiff were C. S. Batterman of Aspen, Col.; Carl Hand of Butte; A. D. Churchill, John R. Parks and G. G. Swallow of Helena. For the defendants there appeared Rossiter E. Raymond of New York; Charles Goodale, superintendent of the Great Gagnon mine at Butte; C. A. Molson, superintendent of the Elkhorn mine; George H. Robinson of Utah, formerly manager of the Drum Lummon, and Henry Bratnoble, who helped to sell the Drum Lummon to the English company. The attorneys for the St. Louis company were Warren Toofe, N. W. McConnell and John B. Cleyberg of Helena, while W. E. Cullon of Helena, Charles Hughes Jr. of Denver and Judge M. Kirkpatrick of Butte represented the Drum Lummon Company.

The case has been not only notable in that it involved such a large sum, but also because of the great expense attending it. The experts on both sides were high-priced men, and in this one item alone the fees amounted to over \$100,000, and altogether the costs, exclusive of the lawyers' charges, will reach \$150,000.

Prizes for Scientific Research.

In October, 1891, Thomas George Hodgkins, Esq., of Setauket, New York, made a donation to the Smithsonian Institution, the income from a part of which was to be devoted "to the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man." With the intent of furthering the donor's wishes, the Smithsonian Institution now announces the following prizes to be awarded on or after July 1, 1894, should satisfactory papers be offered in competition: 1. A prize of \$10,000 for a treatise embodying some new and important discovery in regard to the nature or properties of atmospheric air. These properties may be considered in their bearing upon any or all of the sciences—e. g., not only in regard to meteorology, but in connection with hygiene, or with any department whatever of biological or physical knowledge. 2. A prize of \$2,000 for the most satisfactory essay upon (a) The known properties of atmospheric air considered in their relationships in research in every department of natural science, and the importance of a study of the atmosphere considered in view of these relationships. (b) The proper direction of future research in connection with the imperfections of our knowledge of atmospheric air, and of the connections of that knowledge with other sciences. The essay, as a whole, should tend to indicate the path best calculated to lead to worthy results in connection with the future administration of the Hodgkins foundation. 3. A prize of \$1,000 for the best popular treatise upon atmospheric air, its properties and relationships (including those to hygiene, physical and mental). This essay need not exceed 20,000 words in length; it should be written in simple language and be suitable for publication for popular instruction. 4. A medal will be established under the name of the Hodgkins Medal of the Smithsonian Institution, which will be awarded annually or biennially, for important contributions to our knowledge of the nature and properties of atmospheric air, or for practical applications of our existing knowledge of them to the welfare of mankind. This medal will be of gold, and will be accompanied by a duplicate impression in silver or bronze. The treatises may be written in English, French, German, or Italian, and should be sent to the Secretary of the Smithsonian Institution, Washington, before July 1, 1894, except those in competition for the first prize, the sending of which may be delayed until Dec. 31, 1894. A principal motive for offering these prizes is to call attention to the Hodgkins Fund and for the purposes for which it exists. Suggestions and recommendations in regard to the most effected application of this fund are invited. It is probable that special grants of money may be made to specialists engaged in original investigation upon atmospheric air and its properties. Applications for grants of this nature should have the indorsement of some recognized academy of sciences, or other institution of learning, and should be accompanied by the evidences of the capacity of the applicant, in the form of at least one memoir already published by him, based upon original investigation. To prevent misapprehension of the founder's wishes, it is repeated that the discoveries or applications proper to be brought to the consideration of the committee of award, may be in the field of any science or any art without restriction; provided only that they have to do with "the nature and properties of atmospheric air in connection with the welfare of man." Information of any kind desired by persons intending to become competitors will be furnished on application. All communications in regard to the Hodgkins Fund, the Hodgkins Prizes, the Hodgkins Medals, and the Hodgkins Fund publications, or applications for grants of money, should be addressed to S. P. Langley, secretary of the Smithsonian Institution, Washington, U. S. A.

THE CARSON MINT.—A saving of \$65,000 per year will be made by Secretary Carlisle by the suspension of coinage at the Carson Mint, in Nevada, after the close of May. The mint at Carson is the least important in the country. Only about \$100,000 a month was deposited for coinage in gold bullion, and the expense rose to nearly 8 cents per piece at Carson, against 1½ cents at Philadelphia and less than 1.2 cents at New Orleans. The suspension of coinage will dispense with the services of some forty employees, receiving wages of \$50,000 per year, and will save incidental expenses of from \$12,000 to \$15,000. The mint will not be altogether closed, but will be kept open for receiving gold and silver bullion, for parting and refining, and for the purchase of silver bullion under the Sherman act.

The Storage of Water for Irrigation.

The *N. Y. Independent* is doing an excellent work in educating the Eastern mind on the subject of irrigation for the arid lands. It has recently published articles from many special students of irrigation, one of which we reproduced in last week's *PRESS*. We now make other selections from the same source; first, from A. P. Davis' article on "Storage of Water for Irrigation," as follows:

The problem of water storage for irrigation is a very different one from that for the domestic supply of a city. In the first place, it is important that water for domestic use be as nearly as possible free from mud and organic impurities, while for irrigation such impurities are not only no objection to the water, but often materially add to its value by enriching the soil to which it is applied. In the second place, it is far more easily defeated by the expense of construction. A city of a hundred thousand people may consume no more water for domestic use than would be required to irrigate a square mile of land in the arid region; but such a city may very easily and conveniently pay for its supply several hundred thousand dollars, a sum many times as great as could be afforded for the same water for irrigation.

The range of capacity in proportion to cost, and the distance the stored waters can be carried, is, therefore, far less in the case of reservoirs for irrigation than for domestic supply, and only such sites as have large capacity and exceptionally favorable dam sites can be used.

In the selection of reservoir sites regard must be had to several considerations. The area and character of land to be irrigated, and its distance from the proposed reservoir. The area of the watershed, the drainage from which is to fill it, and both the maximum and minimum annual rainfall of the watershed. If the quantity and value of the land to be watered and the capacity of the reservoir are great, as compared with the available water to be stored, it may be advisable to build a reservoir of sufficient capacity to contain much more than the minimum annual run-off, so that the discharge of wet years may be saved for use in time of drought.

The mean discharge of streams varies considerably with the topography of the basin, and with the character of the soil and climate. A basin composed largely of very steep, rocky, barren mountain sides, will discharge a larger percentage of its rainfall than one that is comparatively flat and covered with soil and verdure, and its floods will be far higher and more sudden. In an arid region it is never safe to count on storing more than 50 per cent. of the rainfall, and in many cases the available supply will fall below 40 per cent.

RESERVOIR SITES

May be divided into two great classes: Natural lakes or depressions, and reservoir sites on drainage lines.

Lakes often afford large storage capacity with small expense for outlet cut or tunnel, and perhaps a small dam or dams. Such dams as may be necessary to afford the required capacity can more often be constructed of earth than in the case of reservoirs on streams, as the foundation is far more likely to be of fine sand or loam rather than rock or shale. Such sites have two important advantages—the dams are not endangered by the enormous floods that are bound to occur on streams, and an opportunity is afforded for disposing of the rock and silt from the storm waters stored, before they reach the reservoirs.

The chief expense attending this method of storage is usually the diversion and transportation of water from some neighboring stream, and this expense is very greatly increased from the fact that the volume of water to be conducted is never constant, but comes chiefly in floods discharging several hundred times the average flow of the stream, and in order to approximate its conservation a canal must be built large enough to carry the heavy floods, unless storage can be provided on the stream itself. Where a large natural basin occurs in reach of an important stream affording a small subsidiary reservoir site at a higher elevation, the conditions for water storage are ideal.

The selection of a suitable reservoir site on a stream is no simple task. The fall of the stream, and the slope of the adjoining land toward the stream, is often very deceiving to the unpracticed eye, and the area of the reservoir consequently much smaller than it looks.

The average depth of such a reservoir is seldom over two-fifths the height of the dam, and often less than one-third, making the capacity far less than may appear.

A careful set of borings is usually necessary to determine the depth of excavation to a suitable foundation for a dam and the character of such foundation. An ample spillway must also be provided; this, as has been well said, is the most important part of the work, as more dams have failed from defective spillways than from bad construction.

CONSTRUCTION OF DAMS.

Dams may be built of earth, loose rock or masonry, or of a combination of these materials. Earthen dams, where practicable at all and not too high, are usually far cheaper than those built of rock; and this, as we have seen, is nearly always the determining feature of water storage.

An earthen dam must have a broad foundation of some kind of earth, preferably a clayey or sandy loam, but never of rock or shale. Suitable material for construction must also be at hand. This should consist of any kind of fine, homogeneous earth, nearly free from coarse gravel, rock and shale. The dam must, of course, be water-tight, not only to prevent the escape of water, but to prevent its own destruction. This is sometimes accomplished by means of a masonry core, consisting of a thin masonry dam built up the center of the embankment; sometimes by a core of puddle work, of selected material solidly rammed to prevent leakage, and sometimes the face of the dam is composed of such puddle work. The most approved modern method, however, is to make the entire embankment as nearly impervious as possible by carefully excluding rocks and other coarse materials, and having the embankment well rolled and tramped throughout its construction. A

submerged puddle core should, however, be built the entire length of the dam to prevent seepage under it, and should extend for several feet above the base of the embankment. The slopes given should be considerably flatter than the angle of repose of the material used in construction, especially on the interior face, which will be exposed to the action of the water. This should also be faced with rock rammed into place in order to neutralize the erosive action of waves.

Loose rock dams are constructed of rock laid with some care, without mortar, and should be built as solidly as possible, to reduce settlement to a minimum. To render it impervious to water, an apron is built on the upper slope. This apron may be of tarred planking, or an earth embankment, or it may consist of a sort of rubble masonry laid in rich asphalt, which has sufficient elasticity to conform to the settlement of the structure if well built. The apron must be carried down to impervious bedrock to prevent percolation under the dam. The cross-section must, of course, be sufficient to enable the dam to resist the water pressure by gravity alone. Except where rock is scarce, or transportation very cheap, or suitable earth distant, a masonry dam is more expensive than the ones above described. There are some situations, however, where it is the only practicable form, and others where it is cheapest, and it is always more ornamental. It is usually built in the form of an arch, with the convex side up stream. It is desirable to use as large rock as possible, as this economizes cement and makes the structure stronger. The mortar must be carefully mixed and well rammed into all joints and crevices. The mortar used on the up-stream face must be very rich, so as to prevent leakage.

Every dam must have a spillway. A masonry dam may itself be a wastewear, provision being made to prevent the washing out of the foundation by the shock of the water. It is better, however, to have a spillway at some distance from the dam, over a saddle in the hills, or, if necessary, through an ample tunnel. This is especially the case with earthen or loose-rock dams, as it is difficult to build a safe wastewear over them.

It is, of course, necessary to provide outlet sluices from a storage reservoir, and these may be either through a dam, or, preferably, through the hills in some other part of the reservoir. These sluices, the gates for controlling their discharge, and the machinery for working the same, must always be accessible for examination and repair.

PREVENTING SILT DEPOSIT.

In most parts of the arid region the storm waters, which are the main source of storage water, carry large quantities of rocks, sand and silt, and introduce, perhaps, the most serious problem with which the irrigation engineer must contend, viz., how to prevent the filling of the reservoir with detritus. Some attempts have been made to deal with this difficulty by constructing dams with several sluiceways through the bottom, through which the water is allowed to rush at times to wash out the silt. This method is by no means satisfactory, as the sluices weaken the dam, the floods allowed to pour through waste large quantities of water, and only that silt near the sluiceways is removed.

A very effective method, where possible, is to locate the reservoir at some point not on the stream from which it is to be filled, and to lead the water by a canal from the stream to the reservoir. At some convenient point on the canal a flume is inserted over a cross-drainage line, so that the flume will be six or eight feet above the ground, and a sand-box or section of the flume constructed wider and deeper than the rest, with its bottom several feet lower than the grade of the canal, so that it will be constantly filled with water flowing at a very low velocity, and in this the water will deposit its load of sand. Large gates are placed in the bottom of the box, which can be quickly opened to allow the sand to drop out, and waste little or no water. The floods in the cross-drainage line are supposed to carry the sand away, or it can be removed with scrapers. The larger the sand-box the more completely will the silt be deposited, and the less frequently will it require opening.

Where the reservoir is situated on the stream that is to fill it, the following method may sometimes be employed for removing the debris: A small reservoir may be constructed up stream, as much higher than the main reservoir as practicable, and the water piped down under pressure, and at favorable periods the sand and gravel may be washed out by hydraulic force, as in placer mining, and allowed to run through sluices provided through the bottom of the dam.

If the flow of the stream is suitable, it may not be necessary to construct an upper reservoir, but only to divert the stream into pipes high enough up to secure sufficient hydraulic force.

This method is effectual but expensive, and not always practicable, as the fall of the stream may be too low to give sufficient hydraulic force without going so far away as to render the cost prohibitory.

The disposal of silt deposited in reservoirs still remains one of the serious problems of irrigation engineering; but, as water and irrigated land become more valuable, as they inevitably must, and storage systems multiply as they are now doing, the combined experience and ingenuity of our engineers will undoubtedly suggest plans and improvements that will constitute its practical solution.

The Eucalyptus.

The eucalyptus tree is a native of Australia and Tasmania, where it forms large forests. There are about 140 species described, but they vary extremely, different kinds of leaves being produced on the same tree, thus presenting distinct specific characters and varying also in the nature of their barks.

In Tasmania and Gippsland, Victoria, they grow to an immense height, often exceeding 400 feet. Their naked and branchless stems of a dirty white color look like natural columns. These are often blackened by the fires of the natives or rung by the settler's ax, when they afford a grand

but dismal spectacle, as one speeds along in the train; in some countries square miles of country have been passed in which the forests have been rung preparatory to settlement, and in some cases for no obvious reason, as the land is unfit for occupation, and there stand those foreign monarchs of the forest like giant skeletons, sapless, lifeless-looking, dismal and forlorn in the midst, oftentimes, of a luxuriant undergrowth.

The trees are named usually according to the nature of their bark, which they shed instead of their leaves, such as stringy bark (*E. obliqua*), iron bark (*E. Sideroxylon*), blue gum (*E. Globulus*), peppermint tree (*E. amygdalina*).

The wood of some is very hard and durable, and so heavy as to sink in water. Many yield a kind of resin or gum, such as *E. resinifera* and *E. amygdalina*. A volatile oil of wonderful medicinal qualities is also produced from the leaves of various kinds, but more especially as that known from the *E. amygdalina*, which is the most productive, and yields nine-tenths of the oil of commerce, though not always placed on the market under its own name.

This arises from a certain amount of notoriety gained for the *E. Globulus* abroad, owing to the fact that it is the easiest of the species to acclimatize. As a matter of fact, however, there is scarcely any *E. Globulus* distilled in Australia. *E. mannifera* yields sweet secretions analogous to manna. *E. Gunnii* furnishes a liquid that ferments and forms a kind of beer. They all produce abundance of seed, which vegetates freely and becomes naturalized in various countries.

The *E. amygdalina* or giant eucalyptus, called "waugara" by the natives, is also known as the peppermint tree. This is one of the most remarkable and important of all the plants in the whole creation. Viewed in its marvelous height when standing forth in its full development of the slopes or within the glens of mountain forests, it represents probably the tallest of all the trees of the globe. Regarded as a hard wood tree of rapid growth, it ranks foremost, and contemplated in respect to its yield of volatile oil from its copious foliage, it is unsurpassed and perhaps unequaled by any tree in the world. These qualities have made it become generally known, and much through the exertions of Baron Von Mueller this tree is now being introduced abroad with good results in countries subject to neither severe frosts nor intense moist heat. It assumes under different climatic and geological conditions various forms. Thus, in the ravines of the cooler ranges it attains its greater height, combined with a perfect straightness of stem, while the bark strips so completely as to render the huge stem quite smooth and almost white.

In the more open country it is much smaller. Under these conditions it is called a "peppermint tree" in Victoria and Tasmania and a "messmate tree" in New South Wales.

In Victoria this tree often exceeds 400 feet in height. Such trees are found on the Black Spur, Upper Yarra Yarra and Upper Goulbourn. A fallen tree on the Dandenong ranges measured 420 feet. The length of the stem up to the first branch was 295 feet. The diameter of the stem where it was broken, 365 feet from the root, was three feet.

A still thicker tree in the same locality measured 53 feet in circumference three feet from the ground.

A tree near Mt. Wellington, Tasmania, has been found which measured 12 feet in diameter, 220 feet from the ground. Another tree was found 130 feet in circumference at the base. Within a square mile 100 trees could be counted with a circumference of 40 feet. At the foot of Mt. Baw Baw, Victoria, is found the highest of the giant trees of Australia. This monster is 471 feet high, and another on the Cape Otway ranges is 415 feet in height. The final height is sometimes attained by a single branch pushing skyward.

It is a grand picture to see a mass of enormous tall trees of this kind with stems of mast-like straightness and clear whiteness so close together in the forest as to allow them space only toward the summit to send their scanty branches and sparse foliage to the free light.

The distillation of the oil was first initiated by Baron von Mueller. *E. amygdalina* yields more oil than any of the other varieties, and is therefore almost solely employed for the purposes of distillation. It is also one of the best for subduing malarious effluvia in fever regions, although it does not grow abroad quite so well or quickly as *E. Globulus*.

The respective hygienic value of various trees may to some extent be judged by the percentage of oil in their leaves, as stated below:

	Per cent of oil.
<i>E. Amygdalina</i>	3.313
<i>E. Oleosa</i>	1.250
<i>E. Leucoxylon</i>	1.050
<i>E. Gonicalyx</i>	0.914
<i>E. Globulus</i>	0.719

The lesser quantity of oil in *E. Globulus* is compensated for by vigor of its growth and early copiousness of its foliage. It readily adapts itself to other climates, and hence abroad nearly all the varieties of the oil are known as *globulus*. During the last 20 years the blue gum has come into high repute as a sanitary tree. A high authority states that the sewage systems of large towns in warm climates would be simplified if each house had the evergreen gum tree in the back yard. The disinfecting and deodorizing virtues of the tree are unquestionable.

Flesh of any kind is as well preserved by eucalyptus as by creosote, while beef sprinkled with it will dry hard without putrefaction. It is fatal to bacteria and other micro-organisms. It may be injected into the veins and arteries of cadavers for purposes of preservation. It is also a good admixture in dressing gangrene.—Journal of American Medical Association.

THE Queen of the Hills mine at Broadford, Idaho, has been sold to an English company. It is understood that F. A. Thompson, the expert who examined the property, has a working capital of \$75,000 to draw upon, and an agreement to buy the Minnie Moore, if the Queen turns out satisfactorily.

State Ownership of Railways.

The *Engineering News*, in discussing this subject, says: "The State ownership of railways has been on trial in Europe for about 50 years. In 1849 the Prussian Government commenced the building of a line from Berlin to its eastern boundary, but the results were generally unfavorable and the ownership by the State would probably have been abandoned had not the military experience of the wars of 1866 and the Franco-Prussian war shown the defects of these existing conditions and the strategic advantages of a well-devised and operated system of railways. Under the new empire the commencement was made in extending and unifying means of communication, and in 1879 a bill was passed providing for the purchase by the State of all railways in private hands. From that time forward these roads were gradually acquired, until the Government now owns 15,530 miles out of the total 16,775 miles of railways in Prussia. In this State the general management of these roads has been at least financially successful, and according to recent information the revenue derived from them not only pays the interest on the railway debt, but also on the entire State debt, and for the fiscal year ending March 31, 1890, there was a surplus of over \$38,000,000 derived from this source. This was the maximum surplus, it is true, but for the year 1891-92 it was still about \$22,500,000. In addition to this successful operation nearly \$160,000,000 of the original railway debt has been extinguished. But, while this is a very favorable showing for Prussia, other European States have not fared so well. France, previous to 1842, had a few minor railways, but by the law of June 11, 1842, it was proposed to establish a vast network of lines under the following conditions: The State was to be responsible for the building of the road-bed, the structures necessary, and one-third of the land required for the right of way, and the departments and communes were to provide the rest of the land. The rails, ballast and material required to operate the roads were to be provided by the companies to whom the operation of the lines was to be leased. While this law has been modified by others passed since 1845, and private companies can now build and operate railways under restrictions imposed by the State, the French Government may still be said to control the railways in that country by a system of subsidies, and in the period of 1884-90 it paid out about \$74,000,000 for the privilege. At the end of 1883 the claims of the State against the railway companies amounted to over \$134,000,000. In other words, State ownership has been far from profitable under the system of subsidizing corporations practiced in France.

"Australian State railways pay at the most 2½ per cent, and Hungarian roads pay about 3 per cent. Italian State railways are in a still worse plight, for they paid only 1.63 per cent in 1892 on an investment of about \$900,000,000, and the tendency is toward still lower dividends under State management. In 1860, says the *Nuova Antologia*, with a capital account of \$109,200,000, the profits were about 3.6 per cent, but with a steady and rapid increase in the total amount invested the profits have as steadily diminished to the figures first given for 1892. A particularly bad omen for the future is the fact that in the same period (1860-1892) the operating expenses have increased from 53 to 70.4 per cent of the gross earnings. Prussia alone seems to have made her State-owned railways profitable. But Prussia built up her present railway system for strategic purposes mainly, and according to all accounts the administrative organization is defective and far from popular. The primary object of location, equipment and control is to meet the emergencies of war rather than to serve the conveniences of the people in time of peace, and that the system does pay such handsome returns as are credited to it can only be explained by the needs of a dense population accustomed to military rules and regulations and more prone to travel from place to place than are the people of France or Italy. In Italy particularly the cost of construction has been enormous, and the line along the coast of the Mediterranean, from the French frontier to the coast opposite Pisa and Florence, is almost one continuous line of tunnels. While the Prussian railways are excellently built and equipped after European standards, they have probably cost less per mile than those of Italy, Austria or Hungary owing to advantages of natural conformation. France subsidizes her railways purely for military purposes, and apparently is content to pay well for the possible advantages this control may some time return in an emergency. She takes no part in the operation and administration of the lines except in that which pertains to the maintenance of lines useful in war and in the general control of the accounts and records."

THE shipowners and sailors of this port have been at outs for a long time, and the Sailors' Union has had rather the best of it. The Shipowners' Association has established an office and made every effort to neutralize the effect of the union in securing men and controlling their actions. The owners want to govern the wages of sailors, and the board of directors have been busily at work devising a scheme to destroy once and for all the influence of the union. A new plan to be adopted by the Shipowners' Association aims to take control of the sailors absolutely out of the hands of the union and of the sailor boarding-house masters. If the scheme is carried into practical operation it will mean the expenditure of thousands of dollars and the engaging of a small army of employees. One of the first and most revolutionary of the innovations is the establishment of boarding-houses for the sailors, to be managed and conducted under the direction of the shipowners themselves. Houses will be rented and men employed. Fare and lodging will be furnished very cheaply, and the sailors will be given treatment they do not receive now. By the establishment of these houses the shipowners wish to secure control over the men not otherwise possible under the present or any other suggested system. As for the shipping of sailors, that is to be done only through the offices of the association, and men of all classes independent of union affiliations will

be accepted as long as they are capable of doing the work required. Branch offices for this part of the work will be placed in every port of moment on the coast. Sailor boarding-house keepers are as much interested in the plan as the Sailors' Union, as their occupation will be gone if the plan is adopted and supported. It will destroy their unenviable business and keep from them the blood-money and profits they have enjoyed for years.

Sprinkling Country Roads.

A committee of the Napa county Board of Supervisors recently visited Alameda, Santa Clara and San Mateo counties for the purpose of investigating methods and cost of sprinkling country roads. The committee found a more complete system in Santa Clara than elsewhere; the part of its report relative to that county is as follows:

"In this (Santa Clara) county, the roads sprinkled are either graveled or macadamized, and what are known as main roads. No public money is spent for sprinkling cross roads; but some are kept watered by subscription.

"Some of the roads near the city of San Jose are sprinkled on both sides; one side in the morning and the other in the afternoon or evening, thereby rendering that portion sprinkled in the morning in good condition for travel in the afternoon, and vice versa; thus keeping the roads smoother than when traveled immediately after being sprinkled.

"Seven hundred and fifty gallon tanks are generally used, and the spread of water from 14 to 16 feet; 750 gallons sprinkle from 1800 to 2000 feet, with team walking at the rate of about three miles an hour.

"Several kinds of pumps are used. One known as the John Stock 7-inch pump made in San Jose, and costs complete, \$60 less plunger rod (wood). Also the Byron Jackson centrifugal pump is used where the water is near the surface. The price of this pump we did not ascertain. Some wells are supplied with horse-power, and others, particularly the deep wells, with gasoline engines. The latter give better satisfaction than the horse-power.

"The wagons and tanks mostly used were built by the San Jose Agricultural Works and the Globe Carriage Works. Width of tire, 4 inches; cost of wagon and tank, \$250 each. They pay for man and team \$70 per month, and as the roads are sprinkled every day, they have steady employment throughout the dry season.

"In company with Supervisor Whitehurst we drove over that portion of the county lying west of San Jose and between Santa Clara, Saratoga and to near the base of the foothills on the Homestead road. This is known as the "dry section," or the part of the county where the wells are very deep, being from 150 to 250 feet in depth.

"On the Homestead road they have 5¼ miles of 2-inch pipe laid and 7 tanks of 5000 gallons capacity each. These tanks cost \$85 each, set up on frames 9 feet high. At the pumping station the water is raised 210 feet with a 6-horse power gasoline engine. The owner of the land dug the well and built the power house and tank therein; the county supplied the engine and all connections; also all material or supplies for engine. The party owning the land does the pumping for the use of water not needed by the county for sprinkling.

"Stevens creek road" is another road similarly managed. Depth of well, 225 feet. From this well about 16,000 gallons are taken daily, the owner of the land giving the use of the water without compensation. This plant has been run two seasons, and has not cost to exceed \$25 in repairs. The running expenses are \$2.25 per day. Length of pipe line, 5½ miles.

"The Saratoga road is piped for several miles, the water being raised from Campbell creek with four water mills. As these places are on high land near the base of the hills, on each road there is a gradual fall in the land from one tank to another, and a constant supply of water is obtained at much less cost to the county than on those roads where pumps are used at each station. It is intended to extend the pipe lines wherever practicable along these roads. The teams sprinkle about eight miles twice a day.

"The rate of taxation for road purposes in this county is 30 cents per \$100, and the amount of assessable property outside of incorporated cities, \$32,709,687. There is no general road fund, so each district, of which there are 17, takes care of its own roads. Weak or impoverished districts are assisted from the "current expense fund" on bridges and culverts.

"Where the county digs wells, the ground is leased for a term of years at a nominal rental of \$1 per year; about 45 feet square being sufficient for horse power; the well being dug on or near the line of the county road. We were informed that they never have any trouble getting the locations, as everybody wants the roads watered during the summer months and cheerfully pay the necessary increase of taxes for that purpose.

"We obtained the following prices on sprinkling wagons from the Studebaker Co. of San Francisco, viz:

"Spring wagon with 750-gallon tank, 3 inch tire, \$500; 4-inch tire, \$510. For steel tank, \$65 extra for 750 gallons, and \$45 extra for 600 gallon tank. Wagon with dead axle, 3-inch tire, 600-gallon tank, \$390.

"We also obtained the following quotations on iron pipe, viz: 2-inch black pipe, dipped, 11 cents per lineal foot delivered on board boat or cars; 10-inch riveted pipe, No. 14 Birmingham gauge, 80 cents per joint of two feet when used double, and \$1 per joint, same length with 6-inch collar riveted on one end.

"We would recommend that wherever practicable the system of gravitation be employed, and at all other stations requiring power to raise water, either a 2-horse-power, or small gasoline engine. If the latter, the same should be placed in charge of some person to insure its safety from destruction by evil-disposed parties.

"And we would further recommend that at present no roads be sprinkled at public expense except such as are known or recognized as main or leading county roads.

Respectfully submitted, G. W. DEWESE, C. M. BURGESS, W. A. TRUBODY, Committee.

The Pegleg Gold Mine a Myth.

For many years past there has been a tradition that Pegleg Smith, a forty-niner miner, once discovered a mine of fabulous richness on the Colorado desert. This mine has been described as being of solid gold and has been the object of innumerable expeditions and great loss of life. This was the object of the Breedlove party's expedition of last year, which ended in the death of all the participants.

Pegleg, who was widely known among the mining men, left a fairly good description of the landmarks and surroundings of his mine, but up to the present no one has ever been able to find anything to indicate there was any basis for his story.

A few months ago ex-Sheriff Martin Aguirre, Edward Mellus, F. C. Mellus and a well-known prospector named Michael Kirby organized an expedition to search for the mine, having obtained maps and descriptions which gave them a reasonable certainty of finding the bonanza. They got back to Los Angeles the other day, and have come to the conclusion that there is no such mine and that old Pegleg was a boss liar.

On the 17th of February last Mellus, in company with the parties previously named, started out with four horses and eight burros for the Colorado desert. They made for a little valley known as the Vallecitos, intending to make that their headquarters. The journey was a long and rough one. Their progress was barred with the almost impenetrable jungles of cacti and prickly mesquite plants, through which the treasure-hunters had to hew their way. The season was the rainy one, and the travelers often rode day and night through the pouring rain without finding shelter of any kind.

At last they reached the little valley and made their camp before commencing their march across the desert. After a short rest the burros were reladen and a start made for the three buttes which old Pegleg had described as being the locality in which he found the shining gold in heaps. Taking warning from the fate of the numerous prospectors who had lost their lives in the search, Mellus first saw to their water supply. Eight barrels, containing 11 gallons apiece, were packed on the burros and the journey was begun.

Not knowing exactly how long it would be before they reached the spring, the party determined to husband their water supply, and for four days the unfortunate burros plodded along in the burning sand without a drop of water.

From this spring, which is so carefully concealed by nature that a man may be parching with thirst within 50 feet of it and not discover its existence, they made their way to the three historical buttes along which old Pegleg had stated lay the gold. When they were reached the party at once commenced their search.

Days and days were passed in fruitless hunting. There were no signs of gold. All of Pegleg's landmarks were found, but not the precious metals. The only approach to it was a decomposed ledge running northwest and southeast. The ledge was honey-combed throughout and the prospectors dug to a depth of 20 feet, but when the dirt was washed not even a color could be found. All that remained were small garnets, none larger than a pin's head. The whole country for two miles around was thoroughly examined, and at last the disgusted treasure-seekers packed up and made their way back over the desert. Speaking to a reporter, Mr. Mellus said:

"I want to say, for the benefit of future prospectors, that there is and can be no such place as the Pegleg mine. I have looked up old Pegleg's record since my return, and, judging from the evidence of his friends and acquaintances, the old man was a blamed old liar. He has been the cause of many a good man losing his life, and I want to say right here that he was a fakir of the first water.

"The only foundation I can find for the story is that years ago miners in going to Fort Yuma used to take the old Butterfield route, which leads in the direction of the supposed Pegleg mine. The Cahuilla Indians used to make a practice of ambushing these miners and robbing them of their gold-dust. I know for a fact that 17 miners were shot down at one time. The Indians, afraid to bring back this dust at one time, used to bury it in the desert and account for their possession of it by stating they had found a wonderful mine, the locality of which, of course, they would not describe. In my opinion this is the source of the story of the wonderful Pegleg mine. Old Pegleg drew on his imagination, which was a good one. Why, he said he got lost and woke up one morning to find glittering lumps of gold all around him."

Mellus is confident that he reached the exact spot declared by Pegleg to be the site of his mine, and that his experience leaves no room for further credence in the old miner's story.

A CONTRACT was awarded in Los Angeles last week, which is regarded as a definite step toward the much-talked-of railroad from Los Angeles to Salt Lake City. The contract was given by the Los Angeles, Owens Valley and Utah Railroad Company to F. E. Green, of Los Angeles, to construct a line of railroad from Mojave to Independence, a distance of 160 miles. The cost will be about \$2,100,000, and the work will be done within nine months. The railroad company is an English syndicate, backed entirely by English capital. The same company is building a canal, 110 miles long, to run from 16 miles above Independence to the end of Indian Wells Valley. By means of this great irrigating main it is intended to open up for settlement 880,000 acres of land, and the new railroad will pass these lands.

A PARTY of gold-seekers sailed for British New Guinea by the Monowai this week. Among them are: Joseph McCauley, Michael Surley of Calaveras, J. Grogan and ex-Manager Houke of the Oakland Water Works. They take with them hydraulic machinery and apparatus and expect to be gone four years. The field is new and has been penetrated by none but McCauley and three others,

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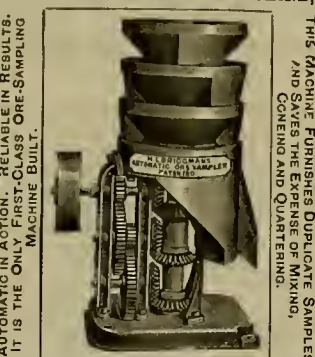
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Scientific Progress.

The Five-Foot Glass Reflector.

Dr. Common recently put before the Royal Astronomical Society the details of his construction of a five-foot reflector. It will be convenient to summarize his results.

The first question that arises with respect to the construction of a reflector is, of course, as to the material of which it should be made. But this is not the time at which to consider it fully; and we will merely remark that, aside from the very well-known advantage peculiar to chemically-silvered glass, there are very important—all but equally important—reasons which could be assigned in favor of the employment of a metallic basis. Where the old-fashioned "speculum metal" is employed at all now, it ought naturally to receive a coating of dense and pure electro-deposited silver. But there is more to be said in favor of other metals, steel, for instance, for the substratum. The structure even of steel (which is in every sense of the word a somewhat refractory alloy) may be made sufficiently homogeneous to receive an exceedingly perfect surface finish, and by the Whitworth method sets of spherically curved surfaces (including planes of course), can be readily manufactured from such metal. If a sufficiently thin bright film of silver could be deposited on steel by chemical or electro-chemical means (which is a question that we shall return to later), then it could be removed by electro-chemical solution in weak cyanide of potassium, without injury to the subjacent metal. The last polish could scarcely be given by working similar metals one upon another; but the tendency to "tearing" might be reduced, as has before been suggested, by working pairs of surfaces coated with different metals upon one another. We will refer to this again, in considering the possibility of using a substance more reflective for actinism than is silver.

Of course, Dr. Common fixed on glass for the material of his great reflector, says the *Optician*. He was not under the necessity of troubling himself over its purely optical qualities; but homogeneity of structure was of the greatest importance for another reason. A focal length of twenty-eight feet seven inches is what was aimed at initially; and it was found that, immediately after two hours figuring, at 23 strokes a minute, with a 15-inch tool, the resin of which is tolerably hard, and the friction, consequently not nearly so much as it might have been, the excess of increase of temperature at the concave surface of the mirror was such as to lengthen the radius of curvature by no less than two inches. After a few hours' rest this great deformation had entirely disappeared. But no matter how slowly the process of grinding may be conducted, with such a material as glass some considerable deformation of this kind must be expected and allowed for. To the manufacturer of a number of large mirrors or lenses, from material of uniform quality, an examination of the rate and manner of development of such deformation as is here referred to would be of interest. Everything by which either the elasticity (the resistance to deflection) or the co-efficient of thermal expansion of the glass is caused to vary from place to place will be harmful in destroying the regularity of this unavoidable deformation, and therefore the symmetry of the surface under treatment.

The first intention of the designer of the five-foot mirror was to employ it in a Cassegrainian telescope, that is, of course, one in which the eyepiece is situated behind the center of the mirror, and the auxiliary small speculum is convex, so that the image which is presented to the eye is inverted. A hole of ten inches in diameter was therefore ordered in the center of the glass disc. While allowing that it is a very easy thing to be wise after the event, we suppose that most foundrymen would have been aware that to cast such a hole in the disc would not be conducive to homogeneity in the structure of the "metal." However, the hole was cast, instead of cut, as it should have been, in the first disc that was made; and in the result Dr. Common found that an irregularity in structure, and consequently in the deformation resulting from frictional heating, rendered hopeless any attempt to obtain the projection of a circular hole, placed at the center of curvature, otherwise than as a roughly elliptical image, the major axis of the ellipse lying always in a particular direction across the face of the mirror. Efforts finally made to correct the ellipticity by local polishing only resulting in general irregularity of figure. Possibly the disc might have been improved by raising it to a very high temperature (to the softening point) and re-annealing. Otherwise it was useless owing to the defect in structure which has been ex-

plained, and perhaps, also, as it is suggested owing to a condition of strain, induced by the fact that the disc, prior to grinding, had stood in an inclined position, i. e., resting at an angle against a wall, for about four years. It is to be hoped that ere long the elastic properties of glass will receive fuller investigation than has yet been accorded to these obscure but interesting and important matters.

It was next decided that a new disc of the present telescope should be ordered to be cast solid with the intention of mounting it as a Newtonian; and the grinding and figuring of this has been successfully accomplished. The finished mirror is in use in connection with a "flat" of 16 inches diameter, obtained from MM. Henry, of Paris.

A Physiological Effect of Cave Visiting.

Dr. Hovey's interesting account of a visit to the Mammoth Cave in March, published in *Science* for April 7, 1893, recalled a recent conversation with my father, Dr. C. Fayette Taylor, on the subject of the cave, which he visited in July, 1860. He was particularly struck with, and vividly describes, the physiological effects experienced on emerging from the cave. He made the usual long trip with some 15 companions, reaching upper air after a stay of about 12 hours under ground. On emerging, the sense of smell was intensified to such an extraordinary degree that most common objects, such as trees, plants, animals and even people had strong individual odors, mostly unpleasant. About half the party were strongly nauseated and vomited. One tree could easily be distinguished from another by its characteristic odor. This effect lasted about half an hour and then passed off. The guides told him that this was a usual experience. Dr. Hovey alludes to this effect of a sojourn in the cave in a lecture published in the *Bulletin of the American Geographical Society*, March 31, 1891, in the following words: "By contrast with the pure oxygenated air of the cave, the odors of the outside world, of the trees, grass, weeds and flowers, are strangely intensified and for many delicate natures overpowering." In a letter dated April 11, 1893, Dr. Hovey says: "I have always, or generally, been accustomed to rest at the entrance on emerging, for the reason that neglecting this precaution is apt to be followed by disagreeable consequences. I have known visitors to suffer from nausea and headaches by reason of a too sudden change from the peculiarly pure air of the cave to that of the outside world. The sense of smell is greatly intensified in almost every case."

I judge that this intensification of olfactory perceptions is due to the rarity of olfactory stimuli in the cave. On emergence, in accordance with a physiological law, the perceptive powers for these particular stimuli, having rested, are intensified, so that odors too delicate to make an impression under ordinary circumstances are powerfully felt. By the constant repetition of the ordinary olfactory stimuli, this effect passes off, and soon only the stronger odors are registered in consciousness. In other words, consciousness is mainly concerned with the registration of the contrast between the stimulus of the moment and a background of fused and undifferentiated impressions. Ordinarily, sensations are increased by more intense stimulation, but they may also be increased, as in the illustration just given, by varying the background so as to bring ordinary stimuli into stronger relief. That a similar effect has been intensified by heredity is illustrated by Dr. Hovey's remarks on the auditory sensitiveness of the cave fauna. He says in the lecture already referred to: "The tiny (blind) fish are colorless, having cartilage instead of bones, are viviparous, and are so sensitive that if a grain of sand should fall on the water they would dart away with rapidity. Blind crawfish are also found here, whitish, semi-transparent, with remarkably long antennae and more delicate in every way than those found in outside streams. These also are highly sensitive and not easily captured."—H. L. Taylor in *Science*.

THE relation of eye-color to health is an obscure question. It is said, for instance, that the health of the brunette type of eye is, as a rule, superior to that of a blonde type. Black eyes usually indicate good powers of physical endurance. Dark blue eyes are most common in persons of delicate, refined or effeminate nature, and generally show weak health. Light blue, and, much more, gray eyes, are most common in the hardy and active. With regard to diseases of the eye, brown or dark-colored are weaker or more susceptible of injury, from various causes, than gray or blue eyes. Light blue eyes are generally the most

powerful, and next to those are gray. The lighter the pupil the greater and longer-continued is the degree of tension the eye can sustain. The majority of first-class shots are men whose eyes are either blue or gray in color. Coloration must not be mistaken for cause. It is only a racial distinction indicative of the characteristics to which it is allied. Doubtless it is largely dependent on natural selection, certain colors having a fascination for certain types of individuals.—*Optician*.

Mechanical Progress.

Recent Examples of Electric Power Distribution.

At a meeting of the New England Cotton Manufacturers' Association, a paper was read by C. J. H. Woodbury, M. Am. Soc. C. E., describing recent developments in electric-power transmission and distribution. He stated that multiphase synchronous motors will be used in transmitting power from Sewall's Falls on the Merrimac river to Concord, N. H., a distance of about four miles. There is a total available power at this place of about 5000 h. p., and it is expected that about 3500 h. p. will be transmitted and utilized the coming summer.

At the new works of the Page Belting Co., at Concord, power is distributed electrically from dynamos in the old works. The whole cost of the electric apparatus was 20 per cent less than would have been required for a steam plant applied in the usual manner. The saving in power is also great. The largest size shafting in use in the new works is 2½ inches; but if the transmission had been solely by shafting and belts the main shaft would have been at least 5 inches in diameter. An incidental advantage of this method of power transmission is that there is not a single open hole in the floors of the new buildings. The openings for the steam pipes are packed around with asbestos.

At a new South Carolina cotton mill an electric motor drives the line shafting in each room. At the Crocker-Wheeler electric works, at Ampere, N. J., the heavier machine tools are driven by an attached motor, and, in place of using cone pulleys to regulate the speed, the motor itself is made to run at the speed desired. For the lighter tools one motor drives a line shaft from which power is taken in the usual way.

One of the most valuable applications of the electric motor is to the direct driving of calico-printing machines. At the Dunnell Print Works at Pawtucket a motor has been at work for 18 months driving a seven-roll printing machine. The uniformity of motion and the ease and smoothness with which the speed can be regulated have enabled the cloth to be printed at 50 per cent greater speed than by the old steam driven machine; and allowing for stoppages to change rolls, at least one-third greater output per machine is obtained. This gain on a machine whose first cost is about \$50,000 is an important one. The success of the application has been such that it is believed that in building a new print works it would be advisable to equip the whole establishment for electric-power transmission.

Oil Furnace for Blacksmith Shops.

For some time past Mr. E. B. Wall, superintendent of motive power of the southwest system of Pennsylvania lines west of Pittsburgh, has been using oil furnaces in his blacksmith shop at Columbus. These furnaces are 5 feet by 9 feet and are designed for heavy work, and have proved so successful, and well adapted for the work required of them, that others are being installed in other shops of the same system. One feature of this furnace that may surprise those who have not had much to do with oil furnaces of such size, is the absence of any stack or other means for carrying off the product of combustion. It has been found by actual experiment that when a stack is placed on such furnaces, the temperature cannot be maintained to as high a point as desired. Without a stack it is evident that the flames and products of combustion have a tendency to creep out wherever there is an opening. For this reason the doors in the front of the furnace are carefully fitted, and it is found necessary to protect the buck-staffs in the immediate vicinity of the doors, extending out a rib of firebrick from the front wall. These furnaces when first installed gave an economy of about 50 per cent over that of the coal furnaces, and an increased output of 25 per cent. The economy was not wholly due to the difference in the cost of fuel, a portion of it being accomplished by the reduction of labor, there being no wheeling and shoveling of coal and

ashes. While the increased output is maintained, the economy has, in a measure, fallen off, not due to the performance of the furnace itself, but because of the increase in the market value of oil since the furnaces were first installed.—*Am. Manufacturer*.

Properties of Aluminium.

Mr. A. E. Hunt, president of the Pittsburgh Reduction Co., says: The slight film of oxide which forms on aluminium exposed to the air is removed by immersion in a dilute solution of hydrofluoric acid, followed by rubbing with a camolite skin saturated with petroleum.

Aluminium loses (permanently) much of its rigidity, and (temporarily) a very large proportion of its tensile strength at a temperature of 400° to 500° F., becomes pasty at 1000° F., and melts at 1300° F. The longitudinal expansion of a 100-foot rod of aluminium is .00115 foot per degree F. Its conductivity for heat is, for hard-drawn wire, 38 per cent, and for annealed wire 38.9 per cent of that of silver. For electricity its conductivity is as high as 50 per cent of that of silver. Thus, one yard of annealed aluminium wire of .0325 inch diameter, at 14° C., has the resistance .05484 ohm.

As regularly put upon the market the metal contains less than one-fifth of one per cent of iron, and is free, therefore, from any appreciable magnetic polarity. By cold hammering, rolling, stamping, drawing, etc., the stiffness and hardness of the metal can be very much increased, as also by the addition of a few per cent of alloy. Quite a small percentage of silver, chromium, manganese, wolfram or titanium is sufficient to distinctly improve the color of aluminium by approximating it to that of silver. For cold-rolling aluminium the number of passes is about the same as for the treatment of soft steel. There is little difficulty in reducing the metal by rolling alone to a sheet of one two-thousandth of an inch thickness. Aluminium is in the best condition for rolling, etc., at a temperature of from 200° to 300° F.

The temperature of annealing is that at which a pine stick is charred by being drawn across the metal, or that at which a piece of iron appears just red in the dark. Of course the aluminium does not itself appear red hot at this temperature—a fact which our readers will have no difficulty in referring to in the high conductive power, and, therefore, low emissivity of the metal, and to the absence of any appreciable coating of oxide upon its surface.

According to Mr. Hunt, successful results can be obtained in soldering aluminium with an alloy of that metal and zinc, with pure zinc, or even spelter or common soft solder, provided that a flux "which has just been covered by letters patent" be employed.

Manganese Steel.

In a lecture recently delivered before the Franklin Institute, Mr. H. M. Howe described the properties of manganese steel. Among the points brought out by the lecturer was the fact that the strength and ductility of the material were both increased by hastening the cooling of the metal. In doing this in the case of manganese steel castings, however, it is necessary to take care that the rapid cooling does not cause cracks at re-entrant angles and other weak spots. In forging ingots of the steel the temperature, Mr. Howe says, should be raised gradually, as the metal conducts heat slowly. During forging the metal acts like a carbon steel containing 1.25 to 1.50 per cent of carbon, and requires heavier blows than most steels. It may be rolled hot into sheets .049 inch thick without special difficulty, and with proper precautions to as thin as .014-inch thick. Cold, it has been rolled still thinner, but requires frequent annealing. In machining it the hardest carbide or chrome steel should be used, Mueshet and other self-hardening steels being unsuitable. Light cuts and very slow feed are essential. As an estimate it takes four times as long to machine manganese steel as common carbon steel. At present the metal has been very successfully used for the pins of dredger buckets, as it resists abrasion in a remarkable manner, wearing only about one-sixth to one-eighth as fast as the best carbon steel. For armor plating preliminary trials with thin plates show that to offer the same resistance as a manganese steel plate a wrought-iron plate would have to be 75 per cent thicker. The metal has also been used for car wheels; 22 such have run on an average 168,653 miles before the first tiring. This figure, Mr. Howe says, is seven times the average mileage of chilled cast-iron wheels on this line, which is a particularly trying one owing to the frequent stops,

A NEW WIRE.—We learn from an exchange that a Connecticut manufacturing firm has brought forward a new resistance metal in wire, sheet or castings, which is regarded as a very important contribution to this class of material in electrical engineering. The wire resembles ordinary copper wire on the outside, has a pinkish-whitening at the surface of fracture, and is very strong without losing much ductility; the torsion test shows over 80 twists in six inches for an annealed wire, which still possesses 70,000 pounds tensile strength to the square inch, and hard-drawn wire is said to run to 100,000 pounds tensile strength, with about 40 twists in six inches. Combined with these favorable mechanical qualities it is claimed that the wire has the remarkable resistance of 35 times that of a copper wire with a temperature co-efficient of less than one-tenth that of German silver. By having the resistance lower than as above described, the tensile strength can be increased up to 140,000 pounds per square inch.

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SAMUEL S. CONNOR [SEAL]
ANDREW S. GRANT. [SEAL]

July 12, 1890.

State of California, City and County of San Francisco.—On this 12th day of July, in the year one thousand eight hundred and ninety, before me, George T. Knox, a Notary Public in and for said City and County, duly commissioned and sworn, personally appeared Samuel S. Connor and Andrew S. Grant, known to me to be the persons described in, whose names are subscribed to, and who executed the within and annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof, I have hereunto set my hand and affixed my Official Seal, the day and year in this Certificate first above written.

[Notarial Seal]

GEORGE T. KNOX,
Notary Public.

I, M. C. HALEY, County Clerk of the City and County of San Francisco, State of California, and ex-officio Clerk of the Superior Court in and for said City and County, hereby certify the foregoing to be a full, true and correct copy of the original Certificate of Copartnership of Samuel S. Connor and Andrew S. Grant, filed in my office on the 12th day of July, A. D. 1890.

Attest my hand and seal of said Court, this 20th day of April, A. D. 1898

M. C. HALEY, Clerk.

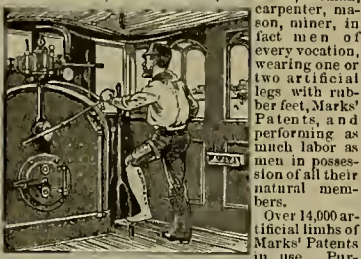
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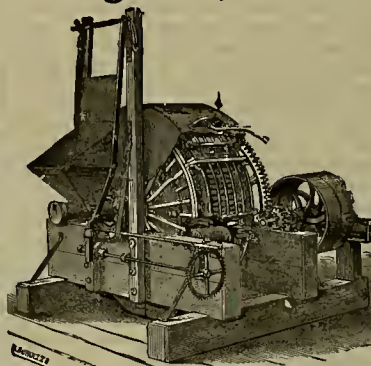
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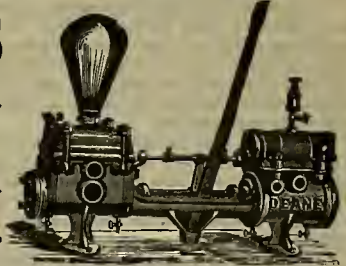
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Electricity.

The Electric Railway Trolley.

Another broad patent for a gigantic monopoly has recently been issued by the Patent Office. This is a patent for the invention of the late Chas. J. Van Depoele, who was a well-known electrician. The patent was applied for in 1887, but other inventors claimed substantially the same thing at the same time, which led to the taking of evidence from the several claimants to determine who was the original and first inventor. These proceedings, termed interference proceedings, have recently been brought to a close, and the Patent Office awards the patent to the administrator of Dr. Van Depoele, the inventor himself having passed away. The patent has been purchased by the Thomson-Houston Electric Co., and if its validity is sustained, of which there is at present no reason to doubt, the above company will enjoy a far-reaching monopoly, covering substantially all the electric railways in the country and the plants therewith connected. Over 6000 miles of these railways are now in operation, and they are being extended rapidly in all directions. This monopoly has 17 years to run. It is probably of greater importance to the public and of more value to its owners than the telephone invention.

The claims of the Van Depoele patent are very broad and comprehensive. The principal claims are as follows:

The combination of a car, an overhead conductor above the car, an upwardly extending and laterally movable arm carried by the car and having its upper end free, and a contact device carried by the arm at its free end, and making underneath contact with the conductor.

The combination of a car, an overhead conductor above the car, a contact device making underneath contact with the conductor, and an arm on the car movable on both a vertical and transverse axis and carrying the contact device.

In an electric railway the combination of a car, a conductor suspended above the line of travel of the car, a rearwardly extending arm pivotally supported on top of the car so as to swing laterally and provided at its outer end with a contact device engaging the under side of the suspended conductor, and a tension spring for maintaining an upward pressure contact with the conductor, substantially as described.—Scientific American.

A Good Profession.

"I consider electrical engineering a very good profession for a young man, but it is a profession which requires considerable exercise of intellect. On account of the fascination connected with the study of electricity the profession draws to its ranks an intelligent class of young men.

"Of course, it is probably true that the majority of young men who enter the profession are more or less enthusiastic, but in these days a knowledge of electrical engineering has become almost indispensable for engineers in general.

"Nearly every engineer at the present time follows with great interest its developments. And it is the same with the medical profession, for physicians are realizing more and more that electricity will ply a still larger part than it does in the cure of disease.

"For instance, a great amount of electrical energy may be sent into the body by means of high currents, because the energy is dissipated laterally from the body and is not passed through it in a direct manner as it is when a current of low frequency is used. The feeling produced is somewhat different.

"I have also noted the importance of one being prepared for the shock. If you are prepared the effect on the nerves is not nearly as great as when you are not prepared. With these high alternations one feels but little pain in the central portion of the body. A remarkable feature of such high currents is that you feel a burn the moment your hand touches the wire, but beyond that the feeling is scarcely noticeable. I have received currents as high as 300,000 volts, an amount which, if received in any other way, would instantly kill."—Nikola Tesla.

STATION VOLTMETERS.—Perhaps the most recent application of photography which has come to play quite an important part in scientific work is a registering device for recording a continuous reading of station voltmeters. The apparatus is described as follows: An incandescent lamp is arranged so that the rays of light which emanate from the glowing filament are directed in a parallel sense upon a narrow slit, before which is

placed the needle of the voltmeter. Obviously, in moving across this illuminated slit, the needle obscures the light and the shadow is then recorded upon the sensitized paper as a white image upon a dark ground (the image of the illuminated slit). By an ordinary clockwork mechanism the sensitized paper, which is rolled upon a drum, is caused to move at a regular rate, and the intervals of time are recorded upon it photographically at the same time as it receives the shadows of the moving needle.

Propelling Canal Boats by Electricity.

About two months ago the New York Legislature appropriated \$10,000 to defray the expense of conducting experiments in propelling canal boats by electricity. At the present time several projects are under consideration and it is hoped that a practical scheme will be evolved that will prove commercially successful. One of the most promising plans submitted is that of a Buffalo engineer, who has worked out the details of a very elaborate system. This scheme in some respects follows the general line of the trolley system of street railways. Power plants will be constructed at regular intervals along the route of the canal, from which current will be supplied by an overhead trolley system to the boats. Three trolley wires will be suspended over the head of the canal and these will be so adjusted that allowance will be made for a boat departing from its regular course. This, of course, would be necessary in order to allow boats to pass each other and make turns and stops at docks. In the stern of the boat will be placed a motor to drive the screw which will propel the boat.

The same considerations which have led to the substitution of the electric motor for animals upon street railways apply to the propulsion of canal boats by electricity. At the present time, it is the practice to provide accommodations for horses upon the boats, and this means that much valuable space is devoted to stalls and feed-hins which could be utilized to advantage. But much more important than mere commercial advantages are the sanitary considerations which should influence the legislature in adopting an electric system. There is no doubt that the presence of horses and mules on the boats is not conducive to good health, and the practice of throwing refuse from canal boats into the sluggish stream is reprehensible. Under the present conditions, however, it is certainly almost impossible to enforce sanitary regulations. New York has a fine waterway in the Erie canal which, if equipped electrically, would be greatly enhanced in value, and would prove an important factor in regulating freight rates. It is to be hoped that the present movement will be followed up until the proposed system shall have been given a fair trial.—Western Electrician.

ACCUMULATOR TRACTION.—Mr. Raymond Schiller, in an article in the *Elek. Zeitschrift*, April 7th, on the calculation of accumulators for street railways, develops a simple formula for calculating the starting power per ton weight of car. He advocates using a battery having a capacity sufficient for two trips, but charging it every single trip; instead of moving the batteries into and out of the car he recommends having as many cars as there are batteries, as the handling of the cells is injurious for the battery. The extra expense of the cars, he claims, is not greater than in the installation for handling the cells in the other case. The battery should be in a separate car, which is coupled to the motor car, the passengers being in the battery car. (But he then loses the advantages of the weight of the battery and the passengers for increasing the adherence at starting.) To prevent the battery from being discharged too rapidly, he recommends putting a resistance in circuit in preference to a fusible cut-out. He thinks it better still to use a battery of high internal resistance, in order to avoid a too great discharge current. In this case higher voltage than too would be used, which, he says, is no disadvantage, as one can then use a mixed system, namely, running the cars with accumulators through the heart of a city and with overhead trolley lines in the outskirts, the accumulator car being uncoupled at the beginning of the overhead line, where the battery is then charged. Such a mixed system, he thinks, is more likely to solve the problem of traction in the cities, and he therefore recommends accumulator manufacturers to make trials with high-tension batteries.

To extract ink from cotton, silk, or woollen goods, dip the spots in spirits of turpentine, and let it remain for several hours; then rub thoroughly between the hands, and it will all disappear without changing either the color or texture of the fabric.

Useful Information.

Future Timber Supply.

The question of our future timber supply and the annual waste from fire is discussed in a special circular sent out to the lumbermen of the United States by Mr. Fernow, Chief of the Forestry Division of the United States Department of Agriculture. As to the demand for timber, Mr. Fernow figures from the census and other returns that we annually use over 22,000,000,000 cubic feet of wood, or about 350 cubic feet per capita. Of this enormous amount over 4,000,000,000 cubic feet of the best material is converted into lumber; railroad construction consumes about 5,000,000,000 cubic feet, and fencing takes about the same; but by far the larger consumption is for firewood. An uncertain amount is burned every year by forest fires, which rage in the western mountains especially, and the total of wood annually disposed of in some way is probably near 25,000,000,000 cubic feet. The area of the United States covered with wood growth is less than 500,000,000 acres, and for the last three decades an increase of about 30 per cent in consumption is indicated for each decade. With this showing, as nearly accurate as the available statistics can make it, it is well to estimate how long this supply will meet an ever-increasing demand. From the careful records of the German government and those of private forests in Europe, it is known that the average annual growth of wood per acre does not exceed 55 cubic feet, and this includes branches and smaller dimensions down to three inch diameter, wood which is not used in this country. If we confine ourselves to the production of sizes of timber utilized by our wood cutters, says Mr. Fernow, our timber at the age of 125 years would not average in growth more than 35 cubic feet per year, so that our present acreage, even if well stocked and well guarded and managed, would not produce our present annual consumption. And as to our total supply, the most extravagant assumption that can be made, even for the enormous Pacific coast forests, is an average of 10,000 feet B. M. now standing on every acre of our wooded territory. With this assumption our standing timber would be exhausted in not much over 100 years; or the time it takes to produce a good-sized sawlog. Most of the timber we are now cutting is over 200 years old, and for some timbers the seed is even now relatively in sight. This is the case for white pine, walnut, yellow poplar and ash.

The remedies suggested are the more careful and thorough utilization of our timber products and especially the prevention of unnecessary waste. The most harmful among the latter are forest fires, which not only destroy or deteriorate in value enormous quantities of timber annually, but also render the soil barren by burning up the leaf mold and seedlings and replace valuable timber by scrub and inferior vegetation.

The Daily Bath.

A daily bath is not only a luxury, it is a necessity. A plunge bath is not within the compass of every one. A sponge bath is always feasible. This may be taken with no appliances beyond the bowl of water, the sponge or wash-cloth, the soap and towel. It is more easily managed with the aid of a large foot-tub, in which the bather may stand while she uses the sponge.

The temperature of the bath is a mooted question upon which doctor and patient disagree. To some persons there is nothing more bracing and invigorating than a cold plunge, while others do not recover for hours from the chill such a bath gives. Certain physicians recommend a very hot bath and assert that it is stimulating in its after effects as is the cold plunge, and less likely to produce ill effects. Nearly all unite in declaring immersion in the tepid bath relaxing, and thus detrimental to health.

The question is one that each bather must settle for herself. What suits one may be positively harmful to another. Certain it is that the hot or warm bath is more cleansing than cold water. The sudden chill of the latter closes the pores and prevents the escape of the effete matter it is the object of the bath to remove. The woman who takes a cold plunge for its after effects should first sponge herself off in warm water and achieve cleanliness before she indulges herself in her "bracer."

Only the best soap should be used in bathing, and many women do not use soap at all, preferring the hags of bran, oatmeal or almond-meal, which may be procured from druggists or other dealers in toilet articles. By the use of these hags the skin is cleansed and softened delightfully. A

greasy skin is sometimes benefited by the addition to the bath of one or two tablespoonfuls of household ammonia. Borax is also excellent for this purpose.

The hand may be employed in scrubbing the person, and may either be bare or covered with a bathing glove of rough Turkish towelling by those who prefer this method to the use of a sponge or wash-cloth. A vigorous rubbing assists the action of the skin.

Whoever feels a chilly sensation after a warm plunge, and experiences difficulty in regaining her normal temperature, should try the experiment of sponging herself off with cold water when she leaves the hot bath, and see if the slight shock will not tone up the skin and prevent any subsequent chill.

The beneficial effect of a bath is greatly heightened by a hard rubbing after leaving it. A rather coarse or rough Turkish towel should be used, and the friction should not be stopped when the moisture has been removed, but continued until the body is in a glow from head to foot. This operation will only require a few moments, and it is well worth the trouble.—Harper's Bazar.

Drilling Holes in Glass.

Julian A. Moses, in "Letters from a Laboratory" in the *Electrical Review*, says: Having had quite recently to drill a number of holes about three-eighths of an inch in diameter in a plate of glass, it became necessary to devise some means whereby this could be easily, rapidly and satisfactorily accomplished. It is, as is everything else, due care must be observed. This very brittle substance will not bear much rough usage, and it is only by gradual means and the removal of exceedingly small particles at comparatively long intervals that will enable the operator to work against the continual threatened danger of exceeding the limit of the allowed strain.

I have heard of holes being punctured at a desired point by the passage of a spark from a powerful battery of Leyden jars; but this appears a rather uncertain means to be employed, for there are too many opposing elements to success, such as the variable thickness of the glass, the necessity for absolute elimination of all superficial moisture, imperfections in the glass and consequent passage of the spark through the path of least resistance, to warrant its use. While the process is rapid, it is extremely uncertain and in the end but a small puncture is obtained. Slow grinding by a rapidly revolving copper or soft brass tube, with suitable abrasive materials, is the safest method.

Notwithstanding the apparent simplicity of the operation, there is a continual liability of cracking the glass from excessive pressure. The device to which I have referred is constructed as follows:

A shallow iron or tin-plate pan should be provided and a layer of rubber cloth put upon the bottom. This elastic material upon which the glass is placed serves as a medium to prevent vibrations, as a resistance to the pressure of the drill and is capable of withstanding the strain and equalizing and uniformly distributing the applied force, thus affording a minimum chance for breakage. Over the glass should be poured sufficient cold water to cover it to about the depth of one-quarter of an inch. Rather coarse emery should be used and the bottom of the revolving copper tube kept continually supplied by means of a feather which has been dipped into the emery. Move the revolving drill up and down about once per second to present new and fresh cutting surfaces and in a short time a circular piece may be removed from the glass, leaving the hole even and smooth. To avoid all possible danger of the glass splitting before the perforation is complete it is best to grind from both sides, allowing the final separation to take place in the middle of the thickness of the glass plate.

As the end of the grinder approaches the opposite surface of the glass the pressure must be gradually diminished, otherwise the great strain obtained, due to the additional friction, will be liable to split the glass. These radial fractures are often in most peculiar shape, and will in a measure determine the quality of the glass.

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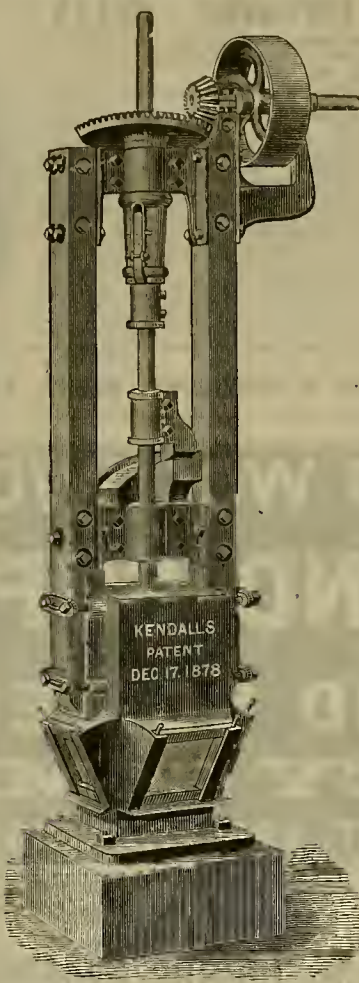
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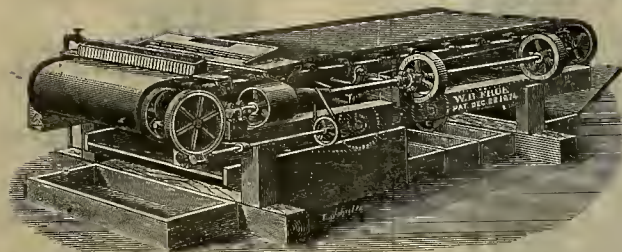
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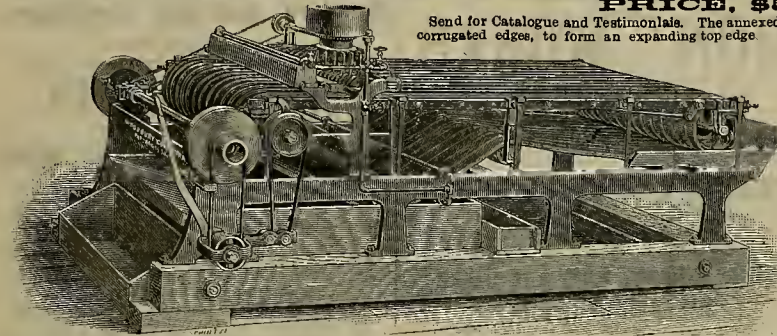
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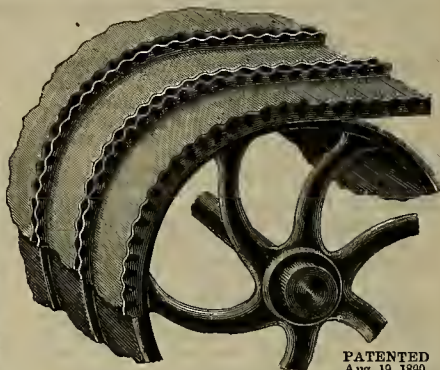
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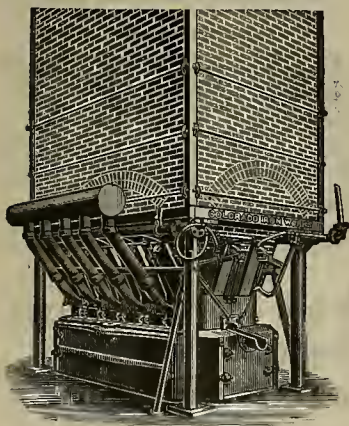
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CALIFORNIA.

Amador.

PLYMOUTH.—Cor. Amador Ledger, May 24: The hotels at this place have been pretty well crowded with mining men from different places the past week; some from San Francisco, some from New York, and various other places; some looking after acquired interest, others looking for chances for investment. E. Montgomery, Hayward's general manager, I suppose, has been looking over the vast estate that the latter is interested in in this county; also Mr. Cross, whom I understand is the general manager of the Hobart estate. I heard of one sale effected this last week. Messrs. Hynde, Adsu & Mathew made a sale of their New London property to Mr. Colman, of San Francisco. I did not learn the terms or figures. I hope these parties have bought a good thing, and that they may have better success than did Messrs. Ballard & Martin. Mr. Colman says that it is the intention of the new company to put up the necessary machinery to work the mine immediately. This same company, I understand, is trying to secure other properties in the neighborhood. The Bay State has now been running its new hoist for two days, and, as I predicted, it has proven a model machine, and gives unbounded satisfaction. They are lowering the water very fast in the mine, and Mr. Griffith, the foreman, says he thinks that, within two or three more days, with no intervening accident, he will see the long-looked-for bottom. I was talking with one of the employees of the Pioneer mine last evening, and he informed me that in the past week in mining the south level they struck some very rich ore, which shows plenty of free gold. He thinks it is high grade, and also states that everything looks well for a fine, large chute of ore. A. M. Vaughn, in doing his assessment work on the extension of the Canaanian, has developed one of the finest ledges that has ever been uncovered in this vicinity. Mining experts that have examined it pronounce it the chief. He was offered \$5000 for the prospect, spot cash, but refused it. I have no report from Smith or Ford this week, but presume everything to be working smoothly. The Wild & Wheeler mill is hammering away, and I have no doubt but that it is with results satisfactory to the company.

MIDDLE BAR DISTRICT.—Amador Ledger, May 26: Our reporter visited Middle Bar mining district last Tuesday in company with Supt. J. H. Tibbitts, of the Albany mine.

THE ALBANY.—The Albany Gold Mining Co. was organized last November, with a capital stock of \$1,000,000. The company owns one mile of land in Middle Bar district. The boundary begins about two miles south of Jackson and extends down the Mokelumne river. There are five separate claims on the property, to-wit, the Hollywood, the Elephen-gine, the Astoria, the Middle Bar and the Littlefield. Each claim is 1500 feet in length and 800 feet in width. At the Littlefield claim a tunnel is being run through the west-country rock. The tunnel is now in 150 feet, and surface measurements indicate that the ledge will be encountered at a distance of about 160 feet. The ledge dips east, so that they may have to go in a little further. The formation of the face of the tunnel, however, indicates that the ledge is not far off. The croppings prospect well. At the Astoria claim a tunnel is being run into the east-country rock. It is now in 185 feet and it is expected to reach the ledge at a distance of 200 feet. The formation is very hard in both this and the Littlefield tunnels, and not more than four or five feet can be run in a week. The Astoria tunnel is high upon the bank of the river, so that a splendid dumping ground is afforded. The Middle Bar claim adjoins the Littlefield on the south and is on the north bank of the Mokelumne. There is a two-compartment shaft down 70 feet, well timbered. There are two parallel ledges, and the croppings indicate that they are from 10 to 20 feet wide. They are about 100 feet apart. The croppings prospect from \$5 to \$7 per ton, while the ledge matter in the bottom of the shaft assays \$10. The croppings are well charged with sulphurets. These veins run north and south, with a dip of about 65 degrees to the east. There is a great fissure between the walls. Supt. Tibbitts says that as soon as the necessary working material can be delivered the Middle Bar shaft will be cleared of water, of which there is about 30 feet. Some kind of surface plant will be erected for that purpose. Mr. Tibbitts is prosecuting work on a systematic and economical basis, and as soon as he becomes satisfied that the Albany Co. has a good property, of which there is little doubt, developments will be begun on a more extensive scale.

THE HARDENBURG.—At the Hardenburg work is being prosecuted vigorously, with three shifts of three men each. The shaft is down 650 feet and it is proposed to sink 800 feet before opening up levels. The miners go down about 50 feet a month. The quartz now in the bottom of the shaft prospects well.

THE FARRALL.—At the Farrell mine, which lies south of the Hardenburg and the Albany, the tunnel is being extended in on the ledge. Three shifts of two hands each are being worked. On the dump there are several tons of rich ore, which will be shipped to Selby & Co., of San Francisco.

COL. ROBINSON'S MINE.—Col. Robinson, just across the river about half a mile, has begun operations by cleaning out the tunnel and extending it.

A NEW MILL.—Just west of Col. Robinson's

mine, in Gwin Mine gulch, the Giant Powder Co., of San Francisco, is erecting a five-stamp mill, a hoarding-house and sleeping apartments. The mill is second-hand, having been brought down from Murphy's. Twenty names are on the pay-roll of this mine.

GREAT ACTIVITY.—There is great activity in Middle Bar district, and every mine is being worked on a legitimate, systematic and economical basis. The men who have charge of these various properties have had long experience in mining and are going ahead in a business-like manner. There is not a "wild-cat" scheme in the district. The day is not far distant when Middle Bar district will become one of the famous gold-producing sections of Amador county.

IN OTHER SECTIONS.—The Thomas-Bothwell mine, of which our Forest Home correspondent has spoken of late, is a gravel claim, on the creek about two miles below Forest Home, and is on the land of Mrs. Ritter, of Sutter Creek. Thomas and Bothwell commenced work there about three months ago, tearing down the banks of the creek with three monitors, using water from the Ritter ditch, which they have leased. As the bank was torn away it was washed through a sluice, about \$4000 being cleaned up. The bed of the creek was so flat, however, that the tailings soon obstructed the flow of water and some method had to be devised by which a flow could be obtained. This, for a time, was accomplished by elevating the sluice boxes, but throwing the bedrock scrapings into elevated sluices with shovels proved to be an expensive operation; so the company has decided to put in a hydraulic elevator to throw the washings up about 20 feet and into the sluices, and also to put in a tailings elevator to carry away the accumulated material which stops the flow of water. In this work they will use about 1400 inches of water and employ between 20 and 30 men. The Kennedy people have struck the ledge at the 1650-foot level, at about 25 feet from the shaft. They had to crosscut 50 feet at the 1750-foot level. The rock they have encountered at that point looks better than any they have ever mined, and, in consequence, the stockholders of the Kennedy are rejoicing.

El Dorado.

DRIFT DIGGINGS.—Georgetown Gazette, May 25: The old mountaineer, A. J. Wilton of Kentucky Flat, was down yesterday. He gave a very satisfactory account of himself and the drift diggings of that volcanic-capped district. Mr. Wilton is looking as hardy and cheerful as ever we saw him. It is generally known among his acquaintances that he grows as fine potatoes and apples as the mountain produce, and that lying beneath this agricultural land from 50 to 200 feet is his drift gravel diggings. Just to show how his potato patch has panned out this season he brought from his pocket a handful of nuggets, ranging from \$3 to \$10. This was confidential; but such a sight is too good to keep, and our readers must know it.

Oro Fino.—El Dorado Republican, May 25: Alvinza Hayward and C. D. Lane have bought the Oro Fino mine and bonded quite an extent of mining property adjacent thereto. They are moving machinery upon the property from Angels Camp and will sink the shaft to the depth of at least a thousand feet. The fact that Hayward, who is one of the most successful and business-like miners on the Pacific Coast, has taken hold of this property will greatly encourage mining developments in that part of the county.

PROMISING.—Placerville Democrat, May 27: The mining outlook in El Dorado county has not been so promising for many years as it is at the present time. Many changes are taking place by which mines are falling into the hands of capitalists who are able to make developments. Mr. Alvinza Hayward has purchased the Oro Fino mine at French creek and is preparing to work that property on a large scale. We get information from reliable authority that the Starlight mine in the same district is to be started at an early day upon a basis that will assure success. An important event in the interest of mining in this county is the opening up of the old Tullis mine in El Dorado mining district, joining the celebrated Church mine on the north. This mine was opened in 1852 by Mr. Tullis, who, in a primitive way, took out considerable gold, afterward leasing it to a lot of Spaniards who mined the ore and packed it to an arrastre, taking out a large amount of gold, but just how much was never known; and, as the lease was for a percentage on products, it did not prove satisfactory. The property in 1857 passed into the possession of Mr. Caldwell, who sunk several shafts, one of which was about 150 feet deep. From this excavation alone he took out over \$14,000. Mr. Caldwell died, and the mine lay idle for several years, but was finally re-located by Mr. H. F. Tracy of El Dorado, resulting in several years litigation. Mr. Tracy finally obtained title. An arrangement was then made between Mr. Tracy and Mr. J. S. Finch, by which the latter was to do a stipulated amount of work on the mine for a half interest. Seven shafts have been sunk on the vein ranging from 22 to 200 feet in depth, 100 feet apart, showing a continuous ore body from 2 1/2 to 4 feet wide, for a distance of 800 feet. Mr. Finch will now commence a tunnel to open the mine to a vertical depth of 540 feet, which will be much more on an angle of the vein. Two power drills will at once be put to work, and it is expected that within three months the mine will be so far advanced as to justify the construction of a mill. A mill-site has been located conveniently below the mouth of the tunnel, where 400 feet of pressure can be had for water-power. Eleven tons of ore taken from the 200-foot shaft yielded, when crushed at a mill to which it was hauled, \$26.50 per ton. This mine is on a line with, and in the same formation as, the Keystone, Plymouth Consolidated, Springfield, Church and

other prominent mines, and there is every reason to believe, from its present showing, that it is as good as its neighbors. It is gratifying to know that this old mine, which has been a bone of contention for over 40 years, is to be once more started up under the most favorable auspices. The Big Sandy mine recently made a test run which proved entirely satisfactory. The Blue Bird mine, near Sand Mountain, is showing exceedingly well, and a mill is now being erected there, which is expected to be running in about 30 days.

Inyo.

BIO PINE.—Cor. Inyo Register, May 27: The mining interest and confidence in the mineral resources of Inyo have no more faithful advocates than the dwellers of the hamlet. Your correspondent visited some locations at Lead Canyon a couple of times within the past ten days, the first time in company with Geo. L. Cornell of Big Pine and M. D. Ratcliff of Silt Lake. Mr. Ratcliff is an experienced geologist, thorough mineralogist and practical miner. We found the latter gentleman in company with Wm. A. Sanger, of the east side, at Waucoha, they having inspected several claims in which Mr. Sanger is interested, lying between the Sanger ranch and Waucoha springs. Mr. Ratcliff reports seeing some fair chloriding chances in this belt; and predicts that several claims visited will be successfully worked in the near future. The principal claims in the Lead Canyon belt are the Bullion, located by Geo. L. Cornell, ex-Sheriff J. R. Eldred and S. H. Spratt. These parties have two other claims in company. J. N. Munro and R. W. Thomas have some promising claims in this section. Mr. Ratcliff expressed himself as well pleased with the appearance of the ore, the nature of the formation and the natural conditions of the belt. There has been little work done except upon one claim, the New Moon. John Erwin and C. F. Fuller of the prospecting firm of Fuller & Melone several years ago drove a good working tunnel in the ledge matter, encountering small quantities of lead carrying from 12 to 120 ounces of silver, the lead running as high as 70 per cent. Many thousands of tons of ore are now at the mouth of this tunnel which can be worked at a small profit by processes of reduction of late discovery. The south extension of the Bullion shows some fine-appearing carbonate ore, one of the locators of which, Mr. J. N. Munro, intends having the mines developed in the near future. There is excellent forage in this country for horses, and an abundance of wood and water for reducing ore by steam power. Quite a number of old-timers have always claimed that the top indications for a good lead camp are much better in Lead Canyon than at Cerro Gordo, and have predicted that "some day" this section would rival the output of the latter camp in its "whooping" time.

Kern.

THE BRIGHT STAR MINE.—Oakland Times, June 1: The St. Louis and San Francisco parties who recently recommenced work on the Bright Star mine on Pinta mountain have pumped all the water out of the old workings and retimbered the old shaft, which is about 330 feet in depth. It will be remembered that in times past this mine yielded a great deal of gold. But it was worked at a time when all expenses were very much greater than now, and upon encountering a layer of poor ground in the lower levels the mine was shut down. It is now reported that the present owners have found the old pay chute in the bottom level, or else a new one. At any event it is a paying one, and striking it at such a depth is almost certain assurance of renewed prosperity. Deirich Babben, who was one of the owners of the property in its palmier days, has been engaged as underground foreman on account of his familiarity with the former workings. If the pay chute just discovered proves to be permanent it will do much toward reviving the general mining interests of Kern.

Mono.

THE BOUTA CON.—Miner, May 27: During the past week south drift, 200-foot level, Lent shaft, was extended 13 feet. Face in quartz and porphyry. Upraise No. 1 from above drift was extended 11 feet. West crosscut from above south drift was extended 9 feet. West crosscut, 200-foot level, old works, was extended 7 feet. There were employed five miners, one engineer, one blacksmith and carman, one watchman, one foreman.

STANAUARD.—The machinery at the Green creek end of the electric plant was tested this week and everything worked like a charm. The work of retimbering the shaft will be finished in a few days and work will then be resumed in the mine.

Nevada.

VAAY FEW IULA MEN.—Nevada Transcript, May 26: We are informed that there are less idle men in this city than ever known before. Every newcomer that applies for work seems to be successful in getting a job. The appearance of the town seems unusually dull in the daytime, but in the evening the streets are crowded with people. More mining is being done here than for many years past, and consequently there is a greater demand for men.

A RUMOR IN STERKE.—Grass Valley Telegraph, May 27: There was a rumor in town to-day to the effect that some parties who are prospecting on Randolph Flat had been following up a stringer of quartz, and that last night they ran into a "pocket" from which they extracted about \$20,000. We could not trace the rumor to its origin, and do not put much faith in it. Probably the reason that the story started was that some party prospecting on the Byers Taylor ranch below Rough and Ready has struck a rich gold-bearing quartz vein.

BOYNOT THE WORKER.—Grass Valley Union,

May 25: Messrs. Maltman & Burns of Nevada City have purchased the Sulphurets Works on the line of the Narrow Gauge Railroad, erected some time since by Messrs. Higginbottom & Co. The buildings are very large and are directly on the line of the road, which will be a great convenience to the proprietors, as they can handle the sulphurets at a very small cost. It is the intention of Messrs. Maltman & Burns to commence and immediately make all necessary repairs, if there are any to make, and in a very few days they will be ready to commence active operations. Both the gentlemen have had a large experience in the reduction of ores, and there are none better in the State.

HAS RESIGNED.—We learn that W. J. Stewart, who has for so many years been the faithful secretary of the Excelsior Water and Mining Co., has resigned his position. Mr. Stewart will hereafter attend to a drift mine near Rough and Ready, in which he holds a large interest.

A MINING ENTERPRISE.—Grass Valley Telegraph, May 30: Mr. S. B. Fowler of this city, in company with a number of Sacramento gentlemen, has secured a bond on the Granite Hill, better known as the Boston or Wheel mine. A company is being organized and incorporated. Capitalization, 100,000 shares. The Granite Hill gold quartz mine is situated about one mile from the business center of the city of Grass Valley in a southerly direction and on the east bank of Wolf creek, on which are located also many of the great gold-producers of this famous district, notably the Eureka, Idaho, Maryland, Gold Hill, Scadden Flat, Moss Hill, New York Hill, Omaha, Allison Ranch, and is about centrally located relatively to all the present and past large bullion producers. The title to the claim is a United States patent and embraces two thousand linear feet on the lode, extending into the city limits, also 300 feet of the surface on each side of the lode center. Attached to the claim is a water-right, furnishing free power of efficient volume to do all the pumping and hoisting to great depth, also standing timber sufficient to supply all reasonable demands of development for at least five years. Many of the neighboring mines named, together with others more or less remote from the Granite Hill, have yielded hundreds of thousands of dollars in dividends and produced a total bullion output aggregating many millions. The mine has been worked to a depth of about three hundred feet and the shaft has pierced the syenite formation and has entered a slate formation. The ledge has been worked out to a depth of 260 feet; its present size at the bottom of the shaft, according to reports of miners who last worked there, is about 14 inches, being well-defined and heavily mineralized and is in the very best formation. The last 442 tons taken out yielded something over \$19,000, or about \$43 per ton.

Placer.

A BRO STAKE.—Placer Herald, May 27: Hon. Chas. F. Reed made a big strike at his Drummond mine at Forest Hill last week. The ore was taken from what is termed the Eclipse lead and assays from \$20,000 to \$40,000 per ton. As yet the find has not been developed and its extent is not known.

Shasta.

THAY CLAIM A SUCCESS.—Shasta Democrat, May 24: B. Jones and Thos. Harrison, Jr., are making a complete success milling the ore from the Clark mine, formerly known as the old Harrison mine, at Quartz Hill, in Buckeye district. Young Harrison claims to have a secret in preparing quicksilver that makes it a perfect and successful amalgamator. The ore they are milling is refractory, heavily impregnated with sulphur and arsenic. Harrison's prepared quicksilver readily amalgamates the gold. Jones says "the proof of the pudding is chewing the bag." He and young Harrison are making a complete success where all have failed. Their tailings assay practically nothing, their concentrates are not worth shipping, and they are making low-grade refractory gold ore pay a handsome profit. That is proof. The secret of their success is simply in their quicksilver preparation. Having demonstrated the virtue and great value of their process they intend to patent it. Mr. Jones, who has put up the capital to back young Harrison, is more than satisfied. They have been running their mill now two weeks with complete success. We are familiar with the ore in this mine, and have no hesitancy in saying this: If they successfully amalgamate the gold in that ore their secret will work any gold ore in Shasta county, and its value to the mining interests of the county is incalculable. Here is something that the Miners' Association of Shasta County should lose no time in investigating.

BONNAN.—Mr. Coulter, a mining man who has been in the county for several months looking for a mining investment, has located the old Delta mine and the Thompson mine on Dog creek. These mines are about five miles west of Delta. Mr. Coulter was in town yesterday and informed a reporter that he is well satisfied with his prospects on Dog creek. They are developing fine.

BONNAN.—Shasta Courier, May 29: James L. Richardson has bonded or leased the Judge Sweeney mine on Clear creek, near Richardson's, a few miles west of town. A number of men are employed at the Cleveland mine near Middle Creek, which started up recently, making improvements about the mill. Grant Schroter has closed down his mine near the hospital. He has been working four or five men all winter and spring and has taken out some rich rock, but the water is too low to run the pump. We understand that Joseph Bell contemplates taking hold of the property. We understand that operations will be resumed at Bullychoop soon on a big scale. Joseph Bell and Jewett Scranton went out this week to see about starting up their mines there. Quite a force of men were worked at Bullychoop last

season, but the deep snows interfere with winter work. A number of mining men have been in Shasta the past few days looking at property. It is to be hoped that their investigations may result in investment here, and some active work and development. We have plenty of mines and plenty of mine owners here, in fact we are nearly all mine owners, but we lack the dollars to develop our mines. Parties who ought to know about the matter do not confirm the rumor that Iron Mountain is to start up soon. We understand that they intend to make some improvements about the works, but there is nothing definite in regard to starting up the mine and mill. It seems to be the opinion of many that operations will be resumed this year, but the owners have not given out any information on the subject.

SUCCESS AT QUARTZ HILL.—*Redding Free Press*, May 25: We had a talk this week with Bent Jones regarding his success with the ores of Quartz Hill. Bent and young Harrison have five stamps crushing the free-milling ore from the old Clark mine. Heretofore the mine could not be made to pay on account of the arsenic in the ore. Jones says that Harrison has been experimenting for a long time, and as a result of his experiments has discovered a mixture with which he coats the plates and which does away with bad effects of the arsenic. Jones claims that the five stamps are crushing ten tons of rock per day, and that the ore goes from \$10 to \$20 per ton. They have 20 men employed, and the total cost of running the mill and mine is \$50 per day, so it will be seen that there is a good profit realized. Jones will purchase five more stamps shortly, thereby increasing the capacity of the mill at small additional expense.

THE GLADSTONE BOOMING.—Capt. Clark, of the Gladstone Mining Company, was in Redding Thursday. The captain is well pleased with the condition of his mine. He will crush 1700 tons of rock this month and expects to make a good clean-up, as the ore averages well. He contemplates many improvements, such as the erection of a chlorination plant, having now on hand \$25,000 worth of concentrates; also will put in ten more stamps shortly, a new engine, boiler, etc. The miners are drifting east on the vein in the Ohio or lower tunnel, some thousand feet below the apex of the mountain. They are also sinking the Gladstone winze to connect with the east drift from the Ohio. Mr. Clark says that since opening up the Gladstone property he has crushed 45,000 tons of ore. Alexander McCaw, of the Integral Quicksilver Mining Company, was here this week. The works at Cinnabar have started up. Some heavy machinery will be shipped to the mine shortly. Superintendent Thompson of the Mammoth mine, Old Diggings, was here on Monday last. He has commenced a new tunnel, which will be 1800 feet long and will tap the vein about 500 feet deep. Mr. Thompson was in town for timber. L. F. Klemmer showed us a piece of quartz well sprinkled with gold, taken from his mine on the river opposite Rock creek. While running an 80-foot tunnel they put in a small blast on the floor of the tunnel to insert a post, when they discovered that they had run on top of a rich ledge. Robert Elliott, patentee of a "float gold collector," in company with J. D. Simpson, a banker of Paulina, Iowa, and William Vance, owner of the gold beach above Eureka, Humboldt county, arrived here last night, and will try their machine either here or in Trinity county. Mr. Elliott has great confidence in his ability to collect gold from auriferous sands by his process, and he is backed up by several capitalists, among them L. H. Eckhardt of San Francisco, a billiard table manufacturer. Just what this process is we are not advised.

San Bernardino.

MORONOO MINING DISTRICT.—*San Bernardino Times-Index*, May 27: From Knight's hotel to the Rosa mine it is about 20 miles; to Livingston and Allen's mine it is about 27 miles. On the road is Gold Hill and many other mining claims in a greater or less state of development. Gold Hill and a large area of grazing and timber lands are owned by Lucky Baldwin. The mine was worked up to 1878 with a 50-stamp mill. After the mine was shut down the mill was burned, the ruins of which are now standing. Even the tramway used to deliver the ore from the mine to the mill is in a pretty good state of preservation. The houses used by the miners and the officers of the company are standing, being as good as new. Six thousand cords of wood, cut 17 years ago with which to run the mill, remain piled up on the hillsides, somewhat weather-beaten and looking old and wrinkled, but still possessing something of the fire of youth. After having remained idle for 17 years a new company under the direction of Jenks and Lavette has been formed to reopen the mine. A number of men are now at work digging the foundation of a new experimental mill. If it is found that the ore can be worked successfully, then a larger mill will be erected and a big force of men will be kept constantly at work for years to come. Gold Hill, as the name indicates, is a vast ledge of gold-bearing quartz of low-grade ore. The management thinks that it can work three or four-dollar ore successfully. These experiments, if successful, may build up a large mining camp employing hundreds of men. The Rosa mine is now under the superintendency of S. W. Wood—Wheeler, the former superintendent, having made so much money, having worked so hard to bring the mine into a paying condition, that he was compelled to seek relaxation in a trip through the East and to the World's Fair. The mine is now partially developed to the 300-foot level, where a large body of ore 20 feet wide has been opened up, going from \$150 to \$300 per ton. A five-stamp mill goes night and day on the low-grade ores, while the higher-grade ores are shipped to San Francisco by way of Victor. The daily output amounts to from \$200 to \$400

per day, \$60,000 having been taken out this winter. The ore bodies are found in larger quantities at greater depths, and there is enough ore in sight to make the owners independently rich. The orange-growers of Riverside, who own the mine, have proved more successful than some older miners. The mill and hoisting works are of the best. The mill was designed for crushing silver ore, but it works well on gold ore. Only 55 per cent of the gold is saved in working. The dump contains \$50,000 in gold, which some day may be worked over again. The Rosa mine pays out in wages monthly over \$2000. Inglehardt and Cullen of Glendora have the first westerly extension of the Rosa mine, and it has been demonstrated to a mathematical certainty that the easterly end of their claim is at least within 250 feet of the richest body of gold-bearing ore that has ever been opened up in this country. If they do not hit the main ledge at the 300-foot level, there will be something strange developed in mining not before known. Five miles or more beyond the Rosa mine, the Livingstone & Allen mine is located. Experts who have examined this mine say that it is undoubtedly a true fissure vein. It lies in a contact between a slate and limestone formation, just where something rich might be expected. Two shafts have been sunk—one 200 feet deep and the other 50 feet deep. The 200-foot shaft has been partially filled up with debris from a cloudburst, but it will be re-opened at once. In the 50-foot shaft a body of ore that was at first a mere shell has widened out to two feet and runs up into hundreds of dollars per ton.

Sonoma.

COAL.—Arrangements are being made to prospect for coal on a large scale near Mark West, in this county. The Palos Grande Coal and Transportation Company, a corporation composed of Salt Lake and San Francisco capitalists, has bought 2000 acres of land and has raised \$200,000 with which to begin work on the mine and to build a railway from it to the town of Sonoma. From here the company will build a road to Petaluma and thus reach tide-water. The company has let contracts to sink a shaft 500 feet deep, to build a road to Santa Rosa and Petaluma, and to build bunkers, barges and tugs, all to be completed May 10, 1894. Machinery and other material have arrived here, and it is expected the work will begin about the first week in June. Large quantities of good coal have been found in the Mark West neighborhood, and it is thought important mines are sure to be developed.

Trinity.

NEW RIVER.—*Cor. Trinity Journal*, May 27: The mines are looking well and there will no doubt be considerable money taken out this summer. Leas & Nicholson, who have a lease on the Excelsior, have just started the mill. They have 75 or 80 tons of ore out, which is now being packed to the mill. F. J. Ladd has out a run, and will soon start up the Boomer mill. There is quite a lot of ore out from the Sberwood mine ready to be milled as soon as it can be got to the mill. Miller will start his mill in a few days; so you see our boys have not been idle this winter if it has been a hard one. Jas. Mullane came in last week with his train and is packing and hauling the ore.

TAINTY CENTER.—*Cor. Trinity Journal*, May 27: The season has been a very backward one here, as elsewhere, but the majority of all seeds have been planted and are doing fairly well, notwithstanding the fact that there have been several frosty nights. It promises to be a much more favorable season for the miners, who are, after all, the life blood of old Trinity. Prospectors are beginning to arrive with a steady regularity that is decidedly encouraging for the future prospects of this end of the county. A few of the Shasta and Deadwood boys are prospecting in the neighborhood of the Center. Among those from the latter camp are P. McDonald, W. Mortimer, W. Robins and R. McDowell. The boys are having a good time and have been reinforced by G. Simmons and L. Castner from French Gulch, who joined them at their camp on Coffee creek. R. D. Lawrence of Mendocino has returned to his claim on the South Fork; J. M. Cready has returned to his quarters on the same creek; Adams & Magnanant have also taken up their quarters for the season on their mine on Union creek; John Brown has located near the Carr mine; Blackburn & Abrams are working steadily on their claim higher up the creek; S. Conzetta, T. Humpbreys, C. M. Hillyer and J. Bennett are hard at work in Packer's gulch, near Big Flat, and all on Coffee creek. The Parry Bros. are doing well in their claim on the North Fork of Swift creek. L. Baker has also a good claim in that neighborhood. The claims owned by T. Dow, Jr. and Sr., and L. W. Moore on Pool's gulch, and that owned by Dean & Morton, on Hall's gulch, are being worked steadily. There are a number of prospectors on the east side of the river in that locality, among whom are Charley Burns, of Shasta, on Snow gulch; N. R. Brown and J. B. Duncan on Plummer gulch; J. Diddy, S. Cornwell and L. James are working steadily on their mine on Snow gulch. The Bloss & McClary and Haskins mines are working full-banded. The Chinese company are also working steadily. The only quartz mine in the neighborhood is that of J. Strode, near Carrville, on east side of the river. "Jack" is a practical miner and is rapidly getting his mine in working shape. He is putting up a cannon-ball mill and has lots of good-paying ore on the dump ready as soon as the mill is finished. He has got a Huntington mill also, brought up this spring, which he will also set up in due time. This mill, by the way, was hauled over the new road which connects the new bridge with the road to French gulch, but as the county has taken no steps toward finishing the approach on the west end of the bridge, which makes the descent off the bridge a rather

tedious and risky proceeding, as a wagon has to be unloaded and lowered by band and then re-loaded again.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, May 27: 1500 level.—The south west drift, started 75 feet above the sill floor, has been advanced 50 feet in quartz formation of low-grade value. From the end of the southwest drift a west drift has been advanced 15 feet. The first seven feet is in ore of an average assay value of \$25 per ton, and the last eight feet is in quartz formation assaying from \$2 to \$4 per ton. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working west from the old stopes, on the third floor, operating through the apraise, No. 6, carried up from the main northwest drift; also from the old stopes in working north from the crosscut run west from the northwest drift. A south drift started at the end of the crosscut run east from a point 60 feet up in the apraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 36 feet; total length, 118 feet; in quartz and porphyry showing some value. Have continued to extract some ore of fair quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Have extracted during the week from all parts of the mine 223 cars of ore about 225 tons, the average assay value of which per car sample was \$25.65 per ton. The assay value per battery sample of all the ore worked at the Morgan mill during the week (190 tons) was \$23.38 per ton. The Morgan mill has been shut down, and the clean-up of bullion from that mill has been sent to the Mint, the assay value being \$24,154.04.

OPHIR.—1565 level.—The west crosscut started from the bottom of the winze, sunk 52 feet below the sill floor of this level, has been advanced 24 feet; total length, 122 feet; in a porphyry, clay and quartz formation of low assay value. Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican Company.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 21 feet; total length, 259 feet, continuing in porphyry formation carrying clay separations and fine lines of quartz. Have continued the work of making the necessary repairs in the shaft, being joint work with the Ophir Company.

UTAH.—340 level.—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet in from its mouth, has been extended 15 feet; total length, 181 feet; continuing in quartzite for 12 feet, the last three feet is in porphyry formation.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 13 feet, making the total length 360 feet; the face is in porphyry and streaks of quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 18 feet, making the total distance west of the joint shaft 3210 feet; the face is in hard porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 18 feet, making the total distance west of the shaft 3210 feet; the face is in hard porphyry.

ANNES.—On 420 level, have cleaned out east crosscut No. 3, and put in car track to north lateral drift. In north lateral drift put in car track to east crosscut No. 5. Will use this lateral drift instead of the main north drift.

GOULD & CURRY.—200 level.—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 8 feet; total length, 483 feet; face in hard porphyry. Also did some repairing on the 300 and 400 levels during the past week. Suro tunnel level.—At a point in east crosscut No. 1, 75 feet from the main north drift, we have started jointly with the Best & Belcher Company north on a streak of quartz and extended same 10 feet; face in porphyry and quartz. Also did considerable repairing work during the week.

BAST & BELCHER.—200 level.—During the past week west crosscut No. 2, started in northwest drift, 230 feet from our south line, has been extended 16 feet; total length, 116 feet; face in quartz and porphyry. 300 level.—West crosscut No. 4, started in southwest drift 112 feet from west crosscut No. 3, has been extended 12 feet; total length, 82 feet; face in hard porphyry and quartz. Suro tunnel level.—At a point in east crosscut No. 1, 75 feet from main north drift, we have started jointly with the Gould & Curry Company north on a streak of quartz and extended same 10 feet; face in porphyry and quartz. Also did considerable repairing during the past week.

HALE & NOACROSS.—1800 level.—Advanced the apraise in west crosscut on our south boundary 14 feet; total height, 50 feet; the top of apraise continues in quartz yielding low assays. Main shaft.—Are retimbering above the 1300 level and continue making the necessary repairs in main incline.

CHOLLAR.—The repairs to the north drift, 850 level, are not yet completed. The east crosscut near the south line, 930 level, is out 246 feet; face in the porphyry.

POTOSI.—The north drift from east crosscut, 850 level, has not been advanced any on account of timbering. The south raise 80 feet south of Potosi winze, 930 level, is up 94 feet; formation in top is porphyry. The north drift from east crosscut, opposite the Potosi winze, 930 level, is out 94 feet; face is in five feet of

fair-grade ore. The north raise, 1000 level, is up 109 feet on the slope; top shows six feet of fair-grade ore. South raise, 1000 level, 20 feet south of top of raise from 1100 level, is yielding fair-grade ore. The west crosscut, 1000 level, 120 feet south of top of raise from the 1100 level, is out 37 feet; face is in porphyry. Extracted and sent to Nevada mill the past week 545 tons and 250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 525 tons. On hand at mill 120 tons and 1250 pounds. Average battery assays, \$25; average car sample assays, \$25.44. Shipped to the U. S. Mint, Carson, 418 pounds crude bullion.

OCCIDENTAL.—Crosscut No. 6 from north drift, 750 level, is in 43 feet; face is in quartz and porphyry. No. 7 crosscut from the same drift is in 20 feet and is showing seams of pay ore. The main south drift on 650 level has been extended 8 feet; total distance from No. 1 winze 310 feet; the face of the drift is in ore assaying \$18 per ton. The Zadir drift, Suro tunnel level, has been extended 25 feet; total length, 1008 feet from the main tunnel, and is in quartz and porphyry.

KENTUCK.—We continue to extract from two to three tons of ore per day from the 160 level of the average value of \$30 per ton. On the 1100 level we are extending the south drift and have started a raise above the track floor near the north line. The raise is up 15 feet and is in fair-grade ore. The joint west crosscut near the Jacket south line is in 64 feet; face is in clay and porphyry.

WAAN SHAFT.—Are yet repairing the shaft at different points below the 1600 level, and replacing the pipes.

ALPHA.—Are yet engaged in repairing the Ward shaft at different points below the 1600 level, and replacing the pipes.

BULLION.—The repairs to the Ward shaft and replacing pipes below the 1600 level are not yet completed.

EXOREQUER.—Are yet engaged in repairing the Ward shaft at different points below the 1600 level, and replacing the pipes.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 60 feet; the face is in quartz, some of which gives fair assays. The west crosscut from southwest drift, 800 level, is in a distance of 36 feet; formation hard porphyry.

SILVER HILL.—The southeast drift on the 450 level has been advanced 5 feet during the past week, making the total distance from north line 123 feet; the face is in hard porphyry.

Taylor District.

STARTER UP.—*Pioche Record*, May 27: The Monitor mill at Taylor started up last Monday. Teams have been engaged hauling ore for some time. This is good news for that section.

Pioche District.

OLD TIMES.—*Pioche Record*, May 27: The shipment of ore recently made from the Old-Timer brought \$104 a ton. The shipment was made in order to find out the value of the ore, as the assays widely varied. The returns from Salt Lake show that it went 87 ounces silver, half an ounce in gold and 64 per cent lead to the ton. The owners, Messrs. Schofield, Spillman and Flynn, are well satisfied with the result.

FROM BULLIONVILLE.—Large supplies of salt and lumber are constantly arriving. The new tanks are all in place and will soon be ready for operation. The gates are in and the sluiceways nearly finished. Leaching through them will probably be begun early in the June days. Manager W. S. Godbe leaves for Salt Lake next Sunday to be absent about ten days. The stockholders' meeting of the Pioche Con. Co. at Salt Lake on the 5th prox. is one matter which requires his attention. The Howell roaster was fired up Tuesday preparatory to what is expected to be a long and profitable run. It will not now be necessary to stop the furnace for want of cooling floor space, as an abundance of this is provided.

Silver King District.

TO COMMENCE WORK.—*Enreka Sentinel*, May 27: C. J. Boskowitz and John J. Cupid of White Pine county, came in Tuesday evening by way of Silver King district. Bosko is one of his quarterly trips and complaints of dull business generally. These gentlemen are interested in some of the best mines in Silver King district, and think of commencing work there on something of a large scale. They have three claims which are regarded as particularly good prospects. When the Wheatley Bros. get their furnace in running order there Cupid expects to dispose of a considerable quantity of low-grade lead ore, which is already mined there, but too low to ship to Salt Lake.

White Pine District.

ACTIVE.—*White Pine News*, May 20: There is great activity in local mining operations in this district just at present. A new discovery made by Newt Boyd and Thomas Rockhill has given a new impetus to the mining interest. The new find is named the "Hell of the Hell," and shows a vein of five or six feet, carrying \$30 gold ore. There was a rush for the adjoining ground and it was quickly gobbled up. One of the claims has already been bonded to D. H. Jackson, the mining man who has been here for some time examining the Chairman property, and he has put four men to work on it.

UTAH.

A \$600,000 BOND.—*Salt Lake Journal*, May 27: The directors of the Deseret Company held an important meeting yesterday, at which important arrangements were made for a test run on their ore by the Bully Boy & Webster mill. If the results are satisfactory they will either have that company work their ore or

lease the mill for five or six months, at the end of which time the company expect to have a large mill of their own built and ready for business. The company also acted favorably upon the application of English people for a bond on the property for a period of nine months in the sum of \$600,000 net to the company. The latter, however, will continue to operate the property, and should the developments be such that they desire to recede from the bond they can do so by the payment of a specified bonus.

THE PETRO DRAINED.—For two years past the Petro Company, at Bingham, have been running a tunnel to tap and drain the shaft, which has a depth of 600 feet. The tunnel was run from the opposite side of the hill and is 1000 feet long. S. B. Milner informs the *Journal* that the connection was made yesterday, and that 350 feet of water, which was in the shaft, was booming out, carrying with it the track and two or three cars which were in side drifts. All that has yet been discovered of the latter are two or three wheels, while the T-rails are twisted all out of shape and rendered entirely useless. The surveys for this great work were made by Robert Gorlinski, and so accurate were they that the tunnel hit the shaft plumb center, which is especially worthy of mention as he was compelled to work over a hill. The draining of the workings puts the mine in the best possible condition, and Mr. Milner informs us that the mine will be a heavy shipper in the future.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MAY 23, 1893.
498,150.—STUMP EXTRACTOR—J. Abhee, Reno, Nev.
497,942.—RETURN SIGNAL KEY—J. M. Bell, Tacoma, Wash.
497,911.—TREATING COCAINUT HUSK—J. T. Davis, S. F.
498,109.—PUMP GEARING—S. L. Fulford, Los Angeles, Cal.
498,210.—METAL PIPE LOCK JOINT—C. S. Hamilton, Los Angeles, Cal.
498,135.—CONDUIT ELECTRIC RAILWAY—G. F. Moffett, Portland, Or.
498,075.—CAPSTAN—W. F. Murray, S. F.
498,215.—BOMFAR FOR CABLE CROSSINGS—H. E. Peshman, S. F.
497,821.—PIPE EXPANDER—S. D. Robertson, Undine, Cal.
497,820.—LUBRICATOR—L. J. Rogers, Santa Rosa, Cal.
498,084.—PLUMS LEVEL—L. J. Rogers, Pomona, Cal.
497,822.—ELECTRO THERAPEUTICAL APPLIANCE—H. C. Royer, Los Angeles, Cal.
498,085.—VACUUM PAN—C. L. Schallitz, S. F.
498,083.—CALENDAR AND STAMP HOLDER—C. C. Stallman, S. F.
498,090.—STUMP-PULLER—T. A. Terrell, New Whatcom, Wash.
498,043.—FIREARM—C. M. Wollam, S. F.
497,853.—FRUIT-TREE SCISSOR—J. Wright, Los Angeles, Cal.
22,451.—DESIGN FOR CANE—W. S. O'Brien, S. E.
NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COMBINED ROTARY CALENDAR AND STAMP-HOLDER.—Chas. C. Stallman, S. F. No. 498,088. Dated May 23, 1893. The object of this invention is to provide a convenient calendar, showing the days of the week, and, in conjunction therewith, a mechanism for displaying the successive weeks and months of the year, removing those which have already passed, and forming a stamp-holder and handle upon the calendar, whereby the whole is arranged in a convenient single article of desk furniture.

CAPSTAN.—Wm. F. Murray, S. F., assignor of one-half to Samuel Murray. No. 498,075. Dated May 23, 1893. The invention relates to a capstan or apparatus for winding ropes for the purpose of hauling logs or other articles, or for doing work upon vessels. It consists of a winding drum, in connection with gearing, whereby the speed and power of the drum may be changed to suit the character of the work being done.

VACUUM PAN.—Carl L. Schallitz, S. F. No. 498,085. Dated May 23, 1893. This invention relates to an apparatus for evaporating in vacuo, and for continuously supplying and discharging the material so that the apparatus can be run continuously instead of by separate charges, and to partly evaporate the material with vapor from the material which is being evaporated. It consists in certain details of construction.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, June 1, 1893.
9:30 A. M. SESSION.

550 Belcher.....	1.35	100 Mexican.....	1.30
550 Best & B.....	1.15	100 Navajo.....	1.25
550 Bullion.....	1.05	100 Ophir.....	1.80
200.....	.65	500 Overman.....	.35c
200 Challenge.....	.30c	100 Potosi.....	.35c
100 Chollar.....	1.15	50.....	.35c
100 Con. Cal. & Va.....	1.15	100 Potosi.....	.35c
500 Crown Point.....	.75c	100.....	.35c
100 Gould & Curry.....	.80c	100 Union.....	.85c
550 Hale & Norcross.....	.90c	100 Yellow Jacket.....	.80c
400 Kentuck.....	.10c		

2:30 P. M. SESSION.

150 Andes.....	.30c	200 Mexican.....	1.10
100 Best & B.....	1.15	100 Navajo.....	1.25
100 Bullion.....	1.05	100 Ophir.....	1.80
100 Bodie.....	.25c	500 Overman.....	.35c
200 Bullion.....	.55c	100 Potosi.....	.35c
200 Calcedonia.....	.70c	50.....	.35c
250 Chollar.....	1.10	100 Potosi.....	.35c
300 Crown Point.....	.70c	300 S. G. Belcher.....	.15c
150 Con. Cal. & Va.....	1.10	100 Sierra Nevada.....	.80c
600 Gould & Curry.....	.70c	100 Yellow Jacket.....	.75c
550 Hale & Norcross.....	.90c		
300 Kentuck.....	.10c		

Market Reports.

The Markets.

SAN FRANCISCO, June 1, 1893.

In the review of the iron situation the *American Manufacturer* says: "So far as market conditions are concerned there is very little change, though in some quarters there are evidences of a stronger undertone. The extreme depression seems to be over. The advance in southern freight rates has not been followed as yet by a very marked demand in Pennsylvania, for whose advantage the advances were made. This action will have less effect on southern pig iron shipments than might be supposed. Large buyers in all markets continue to buy sparingly, although it was rumored in Chicago that possibly some very large transactions in southern iron might soon be recorded. The probabilities seem to favor large business in steel billets at an early day. Both buyers and sellers are tired of the past hand-to-mouth policy and negotiations were opened a few days ago at both eastern and western manufacturing centers, which indicate large sales soon. The merchant iron mills are not accumulating many orders, though all are running full time. Sheet mills are doing well, and nail factories, hardly with an exception, are enjoying a large, though not remunerative trade. In other branches the signs are for more business, but the fundamental conditions have not been modified. Railroad requirements will soon assume a more satisfactory shape, though they will not be sufficient at any time this year in greatly influence the market. Building and agricultural requirements are quite large. Foundry and machine shop works reported abundant at all points. Small equipments for shops are in good demand."

THE METALS.—Tin has shown a steady decline during the week. Copper and lead are dull.

San Francisco Metal and Coal Market.

ANTIMONY.			
Per lb.....	—	14 English, D.....	—
BORAX.			
Refined, in car lots.....	—	70 Canton tool.....	—
Powdered, do.....	—	70 S. F. Diamond tool.....	—
Concentrated, do.....	—	60 Pick & Hammer.....	—
All grades jobbing at advance.	—	60 Machinery.....	—
COPPER.			
Bolt.....	—	20 Tinplate.....	—
Sheeting.....	—	20 B. V. steel grade.....	—
Ingot, jobbing.....	—	14 1x20, spot.....	—
Bar, base.....	—	14 Pharoah, 14x20.....	—
Norway, base.....	—	20 Do, roofing, 14x20.....	—
IRON.			
Bar, base.....	—	3 Do, do, 20x22.....	—
Norway, base.....	—	4 Pig Tin.....	—
PIG IRON.			
Spot.....	—	COAL.	—
Eglington 30 ton.....	20.00	SPOT FROM YARD—PER TON.	—
Glengarnock.....	21.00	Wellington.....	—
Am. Soft, No. 1.....	22.00	Greta.....	—
Shute No. 1.....	23.00	Nasom.....	—
Puget Sound.....	20.00	Gilman.....	—
Olay Lane White.....	21.00	Seattle.....	—
Langdon.....	22.50	Coca Bay.....	—
Garbarric.....	22.50	Cannel.....	—
Barrow.....	22.50	Egg, hard.....	—
Carzof.....	22.00	Walstead.....	—
CHROME IRON ORE.	—	Scotch Splint.....	—
Per ton.....	10.00	Brymbo.....	—
LEAD.			
Pig.....	—	West Hartley.....	—
Bar.....	—	Australian.....	—
Sheet.....	—	Liverpool Steam.....	—
Pipe.....	—	Scotch Splint.....	—
SHORT.			
Drop, sizes smaller than B.....	—	Lehigh Lump.....	—
B, size of 25 lbs.....	1.80	Cumberland.....	—
Do do, B and larger sizes.....	—	Egg, hard.....	—
B, size of 25 lbs.....	2.00	West Hartley.....	—
Do, size of 25 lbs.....	2.00	OOKE.	—
QUICKSILVER.	—	English, to load.....	—
Home trade, pt.....	—	Do, spot, in bulk.....	—
Ask.....	42.50 @ 43.00	Cumberland.....	—

Eastern Silver Markets.

NEW YORK, June 1.—Following are the closing prices for the week:

Silver in—					
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday.....	37 1/2	82 1/2	in 75	3 90	19 15
Friday.....	37 1/2	82 1/2	10 75	3 90	19 15
Saturday.....	37 1/2	82 1/2	in 75	3 90	19 15
Monday.....	37 1/2	82 1/2	in 85	3 92 1/2	19 15
Tuesday, Holiday.....					
Wednesday.....	37 1/2	82 1/2	in 85	3 92 1/2	19 15

Mining Share Market.

There has been very little doing in mining stocks outside of a movement in Potasi. On Wednesday, during the forenoon, Potasi, which closed on Monday at \$2.85, sold as high as \$3.35. Then came some lively fluctuations, on a descending scale, and Potasi went back to \$3.05. Most of these erratic gyrations in the stock were caused by the manipulations of a little clique who are heavily short on the stock and are trying to make deliveries of shares from day to day and at the same time keep their line of shorts out. Whenever the stock is strong they buy in the "regular way," at a loss, enough stock for delivery and then ask the sellers to make the stock "cash," so they can get it for delivery, and then they turn in, sell out an equal number of shares "regular," so as to keep up their short end. For many days past there has been a difference of from 10 to 30 cents per share between their purchases and sales and always against them, so the clique have been losing heavily in their efforts to wreck Potasi.

In this connection, the *Post* says: "It is about time to enter another protest against the way in which news from the Comstock is manufactured on Pine street and then revamped in the local papers as if obtained direct from the mining officials on the lode. There should be some more reliable means for furnishing speculators with information, especially when a development takes place like that in Potasi. Second-hand news of the kind is thoroughly unreliable and misleading."
"W. E. Sharon, superintendent of Yellow Jacket and other south-end Comstock mines, is in town. Mr. Sharon says there is no foundation in the greater portion of the stories told about dull times on the Comstock." While affairs are not as lively there as they ought to be, the prospects at several points along the lode are very cheering, and it is only a matter of time until a general revival may be expected. So far as the Jacket development is concerned, some good ore has been found in hunches, and it is hoped that these may yet lead to something of importance. Of the Potasi mine Mr. Sharon speaks in the most favorable terms."

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		No. AMT. LEVIED DELINQ T AND SALE.		ASSESSMENTS.	
Ada Cons M Co, Utah.....	4c.	May 10, June 10, June 25.....	J H Chippa, Salt Lake City		
Alpha Cons M Co, Nevada.....	11c.	May 10, June 14, July 6.....	O E Elliott, 309 Montgomery		
Alta M Co, Nev.....	45c.	April 23, June 21, July 12.....	L Osborn, 309 Montgomery		
Big Hole Placer M Co, Utah.....	10c.	April 11, May 15, June 16.....	J Medley, Salt Lake City		
Bullion M Co, Nevada.....	41c.	April 13, May 17, June 7.....	R R Grayson, 331 Pine		
Chollar M Co, Nevada.....	34c.	April 17, May 23, June 13.....	O E Elliott, 309 Montgomery		
Cons New York M Co, Nevada.....	10c.	May 12, June 16, July 10.....	O E Elliott, 309 Montgomery		
Cons St Gothard M Co, California.....	8c.	May 11, June 15, July 6.....	T Wetzel, 37 Sansome		
Empire M Co, California.....	4c.	May 11, June 22, July 3.....	C Tamm Siden, 216 Bush		
El Leopoldo M Co, Mexico.....	3c.	May 25, July 1, July 20.....	Jabez Howes, 214 Pine		
Evening Star M Co, California.....	9c.	April 11, May 13, June 8.....	J J Scoville, 330 Sansome		
Gould & Curry M Co, Nev.....	71c.	April 10, May 15, June 6.....	A D Durhrow, 309 Montgomery		
Gray Eagle M Co, Cal.....	31c.	April 6, May 30, June 20.....	O C Harvey, 309 Montgomery		
Inyo Marble Co, Cal.....	20c.	May 22, June 26, July 20.....	W W Sargent, Mills Bldg		
Justice M Co, Nevada.....	54c.	May 15, June 19, July 7.....	R E Kelly, 309 Montgomery		
Lady Washington Cons M Co, Nevada.....	9c.	April 18, May 23, June 13.....	L Osborn, 309 Montgomery		
North Belle Isle M Co, Nevada.....	23c.	April 17, May 23, June 21.....	J W Faw, 310 Pine		
Overman M Co, Nevada.....	67c.	April 28, June 2, June 23.....	G D Edwards, 414 California		
Silver Hill M Co, Nevada.....	33c.	May 29, July 5, July 23.....	D C Bates, 309 Montgomery		
Niskiyou Cons M Co, California.....	6c.	April 23, June 1, June 23.....	E P Stone, 306 Pine		
Valenzuela M Co, Mexico.....	1c.	May 5, June 8, June 26.....	A E Bull, 421 California		

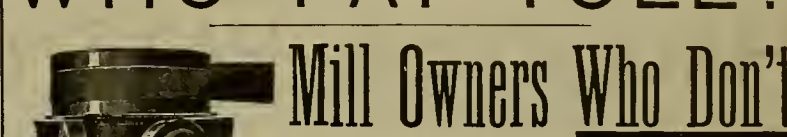
MEETINGS.

COMPANY AND LOCATION.		MEETING. SECRETARY AND OFFICE IN S. F.		DATE.	
Alaska Treadwell M Co, Alaska.....	Annual.	A T Corbina, Mills Bldg.		June 21	
Caledonia G M Co, California.....	Annual.	A Chemant, 309 Montgomery		June 6	
Crown Point G M Co, Nevada.....	Annual.	J Newlands, Mills Bldg.		June 6	
Gold Hill M Co, Nevada.....	Annual.	C A Grow, Mills Bldg.		June 21	
Homestake M Co, Dakota.....	Annual.	I O Stump, Mills Bldg.		June 13	
South Eureka M Co.....	Annual.	A Halsey, 328 Montgomery		June 6	

DIVIDENDS.

COMPANY AND LOCATION.		AMOUNT. SECRETARY AND OFFICE IN S. F.		PAYABLE	
Bulwer Cons M Co, California.....	5c.	L Osborn, 309 Montgomery		Oct 20	
Champion M Co, California.....	10c.	T Wetzel, 310 Pine		May 15	
Cons New York M Co, Nevada.....	10c.	O E Elliott, 309 Montgomery		Feb 15	
Great Western Quicksilver M Co.....	25c.	A Halsey, 328 Montgomery		Oct 8	
Mayflower Gravel M Co, California.....	10c.	D M Kent, 330 Pine		May 15	
Pacific Coast Borax Co, California.....	1 00.	A H Clough, 230 Montgomery		Jan 10	
Standard Cons M Co, California.....	10c.	J W Faw, 310 Pine		Dec 23	

WHO PAY TOLL?



USE THE CELEBRATED
BRYAN ROLLER QUARTZ MILLS.

HOW?

BECAUSE it is the simplest Roller Mill made, therefore IT SAVES IN RUNNING EXPENSES.
BECAUSE it is the only Roller Mill made in which oil is prevented from dropping into the pulp (oil makes it impossible for the quicksilver to amalgamate with the gold), therefore IT SAVES THE GOLD FROM GOING INTO THE TAILINGS. Isn't this tollage?
BECAUSE—well, there are too many ways of paying toll, and besides it would only weary you to read of them.
All who use the mill can testify to its merits. We want to sell you a mill, so write to us for testimonials and particulars, or to some of the users—it makes no difference.

A FEW OF THE USERS:

THE CANDELARIA CONSOLIDATED MINING CO., San Dimas, Dnrago, Mexico.....	4 mills.
THE TABOR MINE AND MILLING CO., Guadalajara, Mexico.....	4 mills.
ELKHORN MINING CO., Baker City, Oregon.....	2 mills.
GILMORE MINE, Virginia.....	1 mill.
CHROMATE AND ASBESTOS MINING CO., Tasmania.....	1 mill.
THE MANY MINES IN CALIFORNIA AND VICINITY, whose addresses we will gladly send you on application.	

RISDON IRON WORKS

CORNER BEALE AND HOWARD STS.
SAN FRANCISCO, Cal.

THE BLASDEL CONCENTRATING BELT COMPANY.

We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen. First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also leave very fine sculptures and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

FOR SALE CHEAP.

FRUE CONCENTRATORS.
(Second-Hand Machines, with New Belts.)

SECOND-HAND ENGINES
In Good Order.
High Speed and Slide Valve.

SECOND-HAND PUMP (In Good Order).
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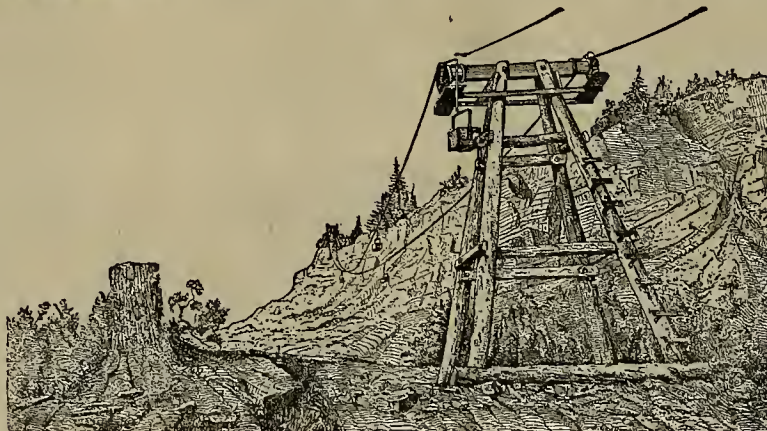
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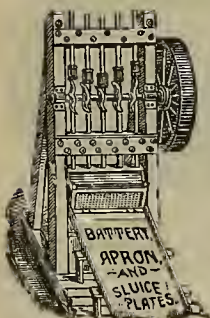
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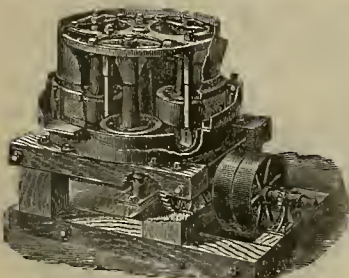
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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL LXVI - Number 23.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 10, 1893.

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SINGLE COPIES, 10 CENTS.

Miners Looking for Work.

Our correspondent, Mr. Schaeffe, calls attention to the great number of idle miners in the camps in the interior of this State. Most of these men have come from silver districts in other States where there is little or no work for them, hoping to find employment in the gold mining regions of California. They know that the gold mines are kept going, and suppose this State the best place to come to for work. But there are already plenty of miners here, there being in fact a surplus. Since the closing of the hydraulic mines some years ago, many employed in that industry had to go into the quartz camps, and there was not employment to be found for one-quarter of them. Numbers have gone into other avocations but always stand ready to come back into mining when opportunity offers.

In what are known as the mining counties of the State there is a large element of the population which has always followed mining for a living and knows no other business. These men dislike the humdrum life of a valley rancher and will not leave their mountain homes unless compelled to by stern necessity. They have become strongly attached to the mountain region where they have passed most of their lives, have built their homes, and raised their families; and it is like a strong tug at their heart-strings when they have to leave. But many of them have been compelled, during the past ten years, to move away from the little mountain camps, because the gravel mines have been closed down, and the towns have gone to decay. The business left the men; not the men the business. Still, those who have had to come to the valleys to earn a living for themselves and families, turn with longing eyes towards the mountains and avail themselves of the first opportunity to get back. When there is a flutter of excitement in any of the old places, as for instance at present in Forbestown, Butte county, Angels, Calaveras county, or Vanderbilt, San Bernardino county, these men, always on the lookout, are the first to go, and before the news goes outside the State, there are plenty of California miners on hand for work.

It is useless for men from Nevada, Montana, Idaho or other places to come here in expectation of finding work. There are more than enough miners here now, and good skillful ones too. There is no expectation of any hydraulic mines starting up this year and the quartz mining districts

are full-handed. If men have a stake, and want to prospect that is a different thing, but looking for mining work for wages will be disappointing.

Freight Rates on the Bay.

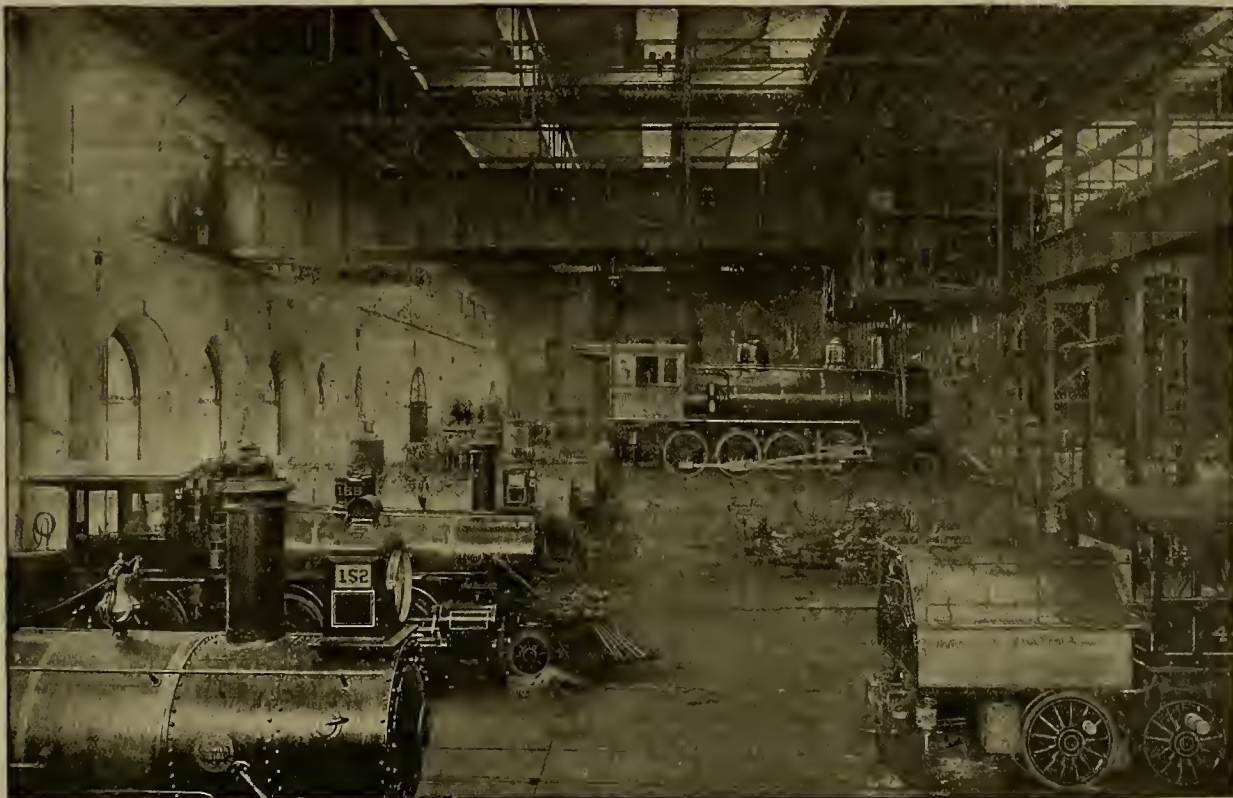
Speeches, pamphlets, editorials, letters, talk or resolutions, popular opinion, proceedings of conventions, chambers of commerce, boards of trade, etc., appear to have little or no effect on the Southern Pacific Co. toward inducing it to cut down freight rates; but a very little practical opposition appeals to the company at once in a

Of course the ferry service of the railroad company is much more complete than that of the opposition line, but the latter has accomplished a great object. One of the big concessions of the new tariff is the provisions that wagons returning empty after delivering a load of freight shall not be charged anything. Heretofore in returning the empty the charge has been \$1.25 for wagons drawn by four horses, 75 cents for a wagon and two horses, 65 cents for a truck drawn by one horse, \$1 for a truck and two horses and \$1.50 for a truck and four horses.

The concession that freight on wagons shall only be charged 50 cents a ton means a reduction in many cases of

50 per cent and 75 per cent in other cases, because the old ferry tariff of April 5, 1893, provided that "for all goods, merchandise or freight conveyed upon the steamer in wagons or trucks with horses attached the charge will be at the rate of 5 cents per 100 pounds * * * Loaded wagons without teams will be charged at the rate of 7½ cents per 100 pounds."

The ferry tariff of the company includes some 270 kinds of merchandise. Under the tariff just superseded rates were divided into two classes, viz, a rate per 100 pounds for any quantity less than a ton and a rate per 100



100-TON HIGH-SPEED ELECTRIC TRAVELING CRANE AT THE BALDWIN LOCOMOTIVE WORKS.—See page 355.

way which makes it respond. It is not a little strange that practical opposition has appeared for the first time in the upper part of the State at Oakland, a city which has the reputation of being in the hands of the railroad company. Not long since the completion of an electric railroad from Oakland through Fruitvale to Haywards, caused the company to make concessions in passenger rates; and now an opposition ferry between this city and Oakland makes the company order a big cut in the freight tariff. The new bay opposition is carried on in a small way, too, yet it has had an almost immediate effect. The Whitney Transfer Co., carrying on an express and freight business, has been paying the Southern Pacific about \$20,000 a year for freight, and the management determined to reduce expenses. A small steamer was fitted up, wharf leases made, and the steamer commenced running, carrying the Whitney and other wagons and freight at a reduced rate. Passenger fare was put down to 5 cents, while the Southern Pacific charges 15 cents. The Southern Pacific Co. therefore reduced freight rates on this route from 50 to 75 per cent. The passenger rates are unchanged because the new ferry line has very limited accommodation for anything but freight.

pounds for lots of one ton or more. The rates in quantities of less than a ton remain unchanged. It is the rate for a ton of freight and over that has been reduced down to a sweeping rate of 50 cents per ton on the deck of the vessels. Some of the merchandise that formerly took a rate of \$1 will now take 50 cents for a ton or over, includes baking powder, wines, liquors, ale, porter, beer, barley, bread, crackers, borax, catsup, cake, coffee, crockery, fish, feathers, dried fruit, hardware, mustard, paints, paper, pepper, raisins, rice and rope. The articles that have had their rate reduced from \$1.50 to 50 cents a ton and over, include clothing in boxes and bales, drygoods in boxes or bales, green fruit, vegetables, furniture, plate glass and window glass. The great majority of the commodities included in the ferry tariff will by the reduced tariff take a rate of 50 per cent lower, because most of the articles heretofore have been charged 5 cents per 100 pounds when shipped in quantities of a ton or more. The company's rates per 100 pounds on shipments of less than a ton range from 2½ cents to \$4. The great majority of these rates are, however, 20 cents and lower. The opposition steamer is being well patronized in freight shipments.

MINING AND SCIENTIFIC PRESS.

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Our latest forms go to press on Thursday evening.

Entered at the U. S. Postoffice as Second-Class Mail Matter.

San Francisco, June 10, 1893.

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Comment.

As will be noticed from the Nevada news in our Mining Summary on another page more attention is being paid than formerly to the gold camps of that State. While Nevada is generally known as the Silver State it has always produced more or less gold. The principal mines on the Comstock yield a much larger percentage of gold than do the ores of ordinary silver districts of the country. But there are many smaller camps in Nevada where gold ore is produced, to which attention is now being turned. In most of these the ore is of a rather low grade and ten years or so since could not be worked at a profit. Now, however, with silver mining unprofitable, and improved and more economical methods in working gold ores, these camps are being prospected and developed. With very few exceptions silver mines are not paying, and as there are many people in Nevada who know no other business except mining it is natural that they should begin to look up the gold mines and see what can be done with them.

The Golden Reward Mining Company of the Black Hills, Dakota, shipped a lot of ore for experimental treatment to the Chick Quick process plant at Pittsburg, Kan., but the process people refused permission to the mining company's president to come and see the process operated, and that ended the business, as it should have done. A "process man" who has a metallurgical secret should be allowed to keep it and the miner should put no faith in him whatever. The patent laws of this country are good enough to protect an inventor, and if he really has anything of value he can afford to patent it, let the people know what he has and charge them for using it. No man can tell what tricks are being played upon him if a process is only worked in secret by the inventor himself. It may be that the Chick people have a valuable method of treating ores, but confidence is not inspired in it by a refusal to let people interested see the operation. This is the same Chick process which was tried in Shasta county, in this State, but it is not being worked there at present, as far as we know.

The Sacramento *Record-Union* quotes the *Call* of this city as saying that "San Francisco's opinion of hydraulic mining is that it would be better for the State if there was not the color of gold on the Sierra Nevada Range." Could anything be more absurd than such a statement as this! This city was built with the gold of the Sierra Nevada Range and prospered until the supply was partly cut off. For two-thirds of the time since this State was organized it was absolutely dependent for its existence on the gold in the Sierra Nevada Range and mining was the principal industry of its inhabitants. As to the city, since the decadence of mining and the supremacy of agriculture it has never been prosperous. The *Call* is altogether mistaken in thus expressing San Francisco's opinion. The senti-

ment is the other way. Not many months have passed since the San Francisco Board of Supervisors, the Chamber of Commerce, the Board of Trade and other bodies which represent the opinion of San Francisco, passed strong resolutions asking Congress to do something to rehabilitate the hydraulic mining industry of California. The State Legislature did the same thing. Of the \$20,000 collected to aid the mining industry, to which all counties contributed, San Francisco gave about 75 per cent, and most of this was donated by merchants, business men and manufacturers. Such things as these do not denote the existence here of any such opinion as the *Call* supposes. In fact they prove exactly to the contrary. The *Call* is writing of a period of ten years ago when it refers to hydraulic mining, but opinions have changed materially since then.

Most of the silver mining camps of the country are in a depressed condition, but Park City, Utah, appears to be an exception to the rule. The *Record* states that in spite of the low price of silver and lead a very active season is expected at Park City. Men are being put on almost every day and an immense quantity of ore is being sent to market. The indications are that the Ontario company will build the new leaching plant now under contemplation, while there is a fair chance for one or two new shippers being added to the present list. Looked at from almost any standpoint, the outlook is promising, to say the least, and the business men are beginning to feel the stimulus of promised larger pay rolls. It is refreshing to find at least one silver camp with a prosperous outlook.

Forbestown is in the southeastern part of Butte county, near the boundary line of Yuba and Nevada counties, and is about one and a half miles from the south fork of the Feather river. It is not a new town nor are its mines new ones, but it has just come to the front with a mining excitement. The quartz mines have been known for a long time but under the conditions existing when they were originally discovered they did not pay. These conditions have gradually changed until a few enterprising men found that there was money in the ledges and started in to develop them properly. Others followed and other mines were opened so that now the region is becoming noted as a quartz camp of prominence and the best prospects. There are other places in the State which will have a similar history in due time as new men come in who recognize better than the older inhabitants the advantages possessed. The low grade propositions formerly ignored by miners will all come to be worked some day, for ledges of gold ore are in demand and modern scientific methods enable men to make a profit out of ore that formerly "went over the dump."

The California Debris Commission Organized.

It is with pleasure we note the organization this week of the California Debris Commission, under the provisions of the so-called Caminetti Act, approved March 1st. About a month since, the President appointed on this commission the following officers of the Engineer Corps, U. S. A.: Col. W. H. Mendell, Lieut. Col. W. H. H. Benysaard and Major W. H. Heuer. There was at first some little doubt, caused by the manner of their appointment, as to whether these gentlemen could serve on this commission, for which duty, by the way, they receive no extra compensation. They held a preliminary meeting and decided to submit certain questions to the U. S. Attorney-General before completing their organization. They are all members of the U. S. Army, and, it seems, are not permitted by law to accept civil appointments while holding their army positions. Their commissions as Debris Commissioners are signed by the President of the United States and apparently in the form of entirely new appointments.

Col. Mendell wrote to the Secretary of War and he submitted the matter to the Attorney-General of the United States. On Wednesday of this week an answer was received, and the opinion of the Attorney-General was given that the appointments were in the nature of an order from the Secretary of War, and not mere civil commissions. Accordingly there was nothing to do but to accept the positions, and on Thursday the Commission was organized by the election of Col. W. H. Mendell as president and Major W. H. Heuer secretary and disbursing officer.

The Commission is therefore ready for business and has formulated the following rules by which proceedings before it will be conducted:

SAN FRANCISCO, June 8th, 1893.

The California Debris Commission, appointed under the Act of Congress approved March 1, 1893, publishes for the information of all concerned sections 9, 10, 11 and 12 of the law which governs in the matter of presentation of petition and proceedings therefor:

SEC. 9. That the individual proprietor or proprietors, or in case of a corporation its manager or agent appointed for that purpose, owning mining ground in the territory in the State of California mentioned in section three hereof, which it is desired

to work by the hydraulic process, must file with said commission a verified petition, setting forth such facts as will comply with law and rules prescribed by said commission.

SEC. 10. That said petition shall be accompanied by an instrument duly executed and acknowledged, as required by the law of the said State, whereby the owner or owners of such mine or mines surrender to the United States the right and privilege to regulate by law, as provided in this act, or any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the working of said mine or mines shall be restrained, and what amount shall be produced therefrom; it being understood that the surrender aforesaid shall not be construed as in any way affecting the right of such owner or owners to operate said mine or mines by any other process or method now in use in said State: *Provided*, That they shall not interfere with the navigability of the aforesaid rivers.

SEC. 11. That the owners of several mining claims situated so as to require a common dumping ground or dam or other restraining works for the debris issuing therefrom in one or more sites may file a joint petition setting forth such facts in addition to the requirements of section nine hereof; and where the owner of a hydraulic mine or owners of several such mines have and use common dumping sites for impounding debris or as settling reservoirs, which sites are located below the mine of an applicant not entitled to use same, such fact shall also be stated in said petition. Thereupon the same proceeding shall be had as provided for herein.

SEC. 12. A notice specifying briefly the contents of said petition and fixing a time previous to which all proofs are to be submitted shall be published by said commission in some newspaper or newspapers of general circulation in the communities interested in the matter set forth therein. If published in a daily paper, each publication shall continue for at least ten days; if in a weekly paper, in at least three issues of the same. Pending publication thereof said commission, or a committee thereof, shall examine the mine and premises described in each petition. On or before the time so fixed all parties interested, either as petitioner or contestants, whether miners or agriculturists, may file affidavits, plans and maps in support of their respective claims. Further hearings, upon notice to all parties of record, may be granted by the commission when necessary.

The petition must, in addition to fulfillment of the requirements of the law, contain, or be accompanied by, a full description covering the following points and by such maps as may be required for illustration of the question:

The name, location and extent of the mining ground; the route of travel thereto; the river which the drainage of the mine reaches and the names of the tributaries which it follows; the height of the bank to be mined; the character of the gravel; the source of the water supply; the length, fall and dimensions of the ditch; the length of the mining season; the number of inches of water proposed to be used and under what pressure; the daily duration of mining proposed, whether for 24 or fewer hours; the fall of the sluice in 12 feet; dimensions of sluice and the amount of gravel to be handled in an hour; the character of restraining barriers existing or proposed; a description of the site for impounding debris; its area and capacity; position and character proposed for the barrier.

Brevity and clearness are to be studied in these descriptions.

The above-stated information may be sufficient to enable the commission, in some cases, to dispense with maps, but in all cases of importance maps of the mining ground and of the reservoir sites will probably be necessary, and in all cases will probably expedite the action of the commission. The commission prefers, for expedition, but does not at present insist, that each case should be presented by a mining or civil engineer capable of giving necessary information.

It will expedite matters if all the miners in one particular locality will prepare and present their petitions as near as possible at the same time, in order that the mines may all be examined during one visit of the Commission.

In cases of a joint petition contemplated in Section 11, there should be a separate statement from each individual mine as to its proposed output, amount of water, etc., the same as provided for a single petition.

All maps, plans, petitions or writings of any description on file in the office shall be open for examination by any interested party.

On the seventh day following the date fixed in the advertisement, the Commission or a committee thereof will attend in its office to meet the petitioners and contestants, for the purpose of gaining by inquiry such explanation as may be necessary for a full understanding of the case.

The Commission or committee may, in its discretion, cause to be read any papers, and may examine maps, plans or drawings on their files.

The commission does not invite oral addresses and prefers that all questions submitted for its consideration be presented in writing.

The commission may receive on this occasion any additional papers presented to it if they are deemed useful in further consideration, or may admit additional papers filed before a specified date.

The office of the commission is for the present established in room 89, Flood Building, San Francisco.

All communications should be addressed to Major W. H. Heuer, Corps of Engineers, room 89, Flood Building.

It will be noted that the Commission organized very promptly after being assured of their position. It is a matter of common report, however, that none of the members desired an appointment on the Commission, as they already have sufficient duties to attend to without these new ones being added. This is rather unfortunate, since it will lead to delay in the consideration of applications for license to mine, and it will take longer for miners to get started to work than they now suppose. This subject is considered in another article in this number of the PRESS.

A THIRTY-TON GASOLINE SCHOONER is being built on Dickie's ways at Old Sausalito for Campbell Brothers of Bodega. She is guaranteed to make eight knots an hour

The Resumption of Hydraulic Mining.

The machinery of the law is now ready to consider the resumption of hydraulic mining in California. Congress and the State have passed the necessary laws; the California Debris Commission has been appointed; the Commission has organized; established headquarters, elected its officers and formulated its rules of procedure. The hydraulic miners may now make their applications for licenses to mine.

But the miners are going to be disappointed in one thing—they will not be able to resume work as soon as they have supposed. It is going to take longer to arrange the preliminaries than was imagined, and those who want to prepare for next season must at once get ready to apply for their licenses.

The new California Debris Commission has been considering this question of the time necessary to complete, under the requirements of the law, an inquiry brought by the presentation of a petition to mine. They figure it up in about this way: Preliminary consideration of the petition, about 7 days; application to the Secretary of War to advertise the abstract of petition, 15 days (this is a requisite of the regulations of the War Department); time for advertising, 21 days; visit to mine pending publication, hearing and deliberation, 30 days; examination of plans and specifications, about 20 days; second examination of mine, 10 days; third examination of mine after works are constructed and before final license is issued, 10 days; this makes 113 days without counting the time necessary for the construction of the impounding or restraining works, which, however, may be going on meantime.

This shows that it will take about four months from the time of the presentation of the petition to the issuance of the license under ordinary circumstances, and if there are contests, or difficulties arise, it may take more. Then again all the commissioners have other duties to perform and cannot give their entire time to the mining question. The War Department naturally considers the river and harbor improvement of the Pacific Coast of more importance than one branch of the mining industry, and this work is in charge of the gentlemen comprising this commission. They have also charge of the fortification and lighthouse engineering and various other matters, all of which now take up most of their time.

They cannot permit the mining debris question to occupy all their time to the exclusion of their other duties, and are often absent from the city engaged upon these duties. The harbors of the entire Pacific Coast of the United States are within their jurisdiction.

They will try to simplify matters as far as possible, as their rules of procedure, published in another column, show. They evidently intend to prevent general discussions and the delivery of long speeches, for they want facts presented in writing. And they seem also, to be in search of engineering rather than legal facts, which is in line with the statements of the MINING AND SCIENTIFIC PRESS that the question had passed from the domain of law into that of engineering.

Now that the hydraulic miners of the State have an idea of the time required to obtain a license to mine, it will be to their interest to at once make the necessary preparations, and not delay until within a few weeks of the mining season. If they do so delay, the fault will be with themselves, not the Debris Commission.

Mine Bell Signals.

We enclose with this number of the MINING AND SCIENTIFIC PRESS to all subscribers in the mining districts a copy of the mine bell signals and rules required by the Vorhees Act, passed by the State Legislature. We have already published this law in full. The copy we send out to the miners is the full legal size, of three feet by one, such as is required to be posted on each level of a mine, and in the engine room of the hoisting works. Other copies printed on cloth to withstand dampness may be obtained at this office for fifty cents. It should be remembered that every mine in this State must post these signals at the various points required by the Act, and they must be signed by the superintendent or owner of the property.

The system adopted is not quite so simple as could have been wished, and many superintendents complain of their intricacy. But the law must be complied with or the penalties may be enforced.

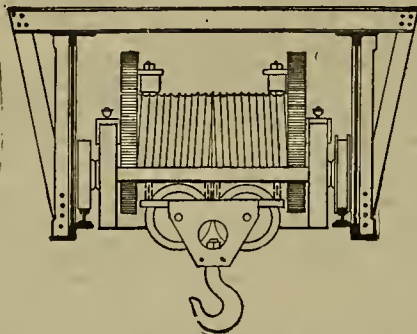
In the full-size copy which we print, space has been left to indicate the station or level signals. We have put no numbers in this space, because each superintendent may arrange that to suit himself and mark the signals with a pen or stencils. What we have printed is only what is required by the law. Any subscriber who wishes one of these copies may obtain it free, printed on paper, by application at this office; but for the copies on cloth a charge is made.

The Electric Traveling Crane.

In an address before the Franklin Institute last March, on the subject of the "The Modern Traveling Crane," Mr. Alexander Onderbridge, Jr., describes a mammoth traveling crane in use at the new erecting shop of the Baldwin Locomotive Works. It is of 100 tons capacity, has electricity for its motive power and was made by Wm. Sellers & Co., of Philadelphia. The engraving on the first pages shows the application of this crane. The span of the bridge is 74 feet 8 inches; length of runway, 355 feet; speed (under absolute control) as follows: bridge travel, 100 and 200 feet per minute; trolley travel, crosswise, 50 and 100 feet per minute; hoisting and lowering, 5, 10, 20 and 40 feet per minute.

The elevated railway traveling crane consists of four essential parts: the elevated tracks; the traveling bridge; the trolley car traversing the bridge and carrying the hoisting mechanism; and the motor or driving mechanism.

The bridge is constructed of two parallel plate girders extending from rail to rail of the elevated tracks, spanning in mid-air the breadth of the building, and on the ends of these are the double-flanged steel-tired wheels. Between the girders heavy steel tracks are laid, upon which a trolley car carrying the hoisting mechanism runs back and forth. By the method of construction of the girders forming the sides of the bridge great rigidity is secured, while the entire space within and beneath the bridge is left unobstructed for the working of the trolley car and machinery. The car which travels on the bridge tracks is provided with a grooved drum and depending double chains wound therein, carrying a forged swivel hook mounted securely in a hoisting block on ball-



bearings, the block being furnished with sheaves through which the chain runs. The friction on the swivel is so reduced by the ball-bearings that it was found in actual trial that a load of 50 tons suspended from the hook could easily be rotated by one man. The winding of the double chain in the grooves of the drum is always toward the center; this insures a perfectly vertical lift of the load, an advantage always and a necessary feature in many instances. This is shown in the small cut.

In the Baldwin shops, the 100-ton electric giant picks up a completed "Mogul" or "Decapod" engine of the largest size, carrying it swiftly over the heads of the workmen and depositing it gently on a railway siding near the exit. Retaining clutches automatically hold the load securely from the moment it leaves the floor until it is re-deposited. The chain can never run down, but the load must always be pushed down by the operator moving a lever.

The operator's post is on a platform or cage supported at a convenient point under the bridge; by simple lever movements he applies the motive-power to drive the bridge along the rails and simultaneously to drive the trolley across the bridge, so that, during the two motions at right angles, the hook depending from the chain travels in the resultant diagonal direction until it is vertically over the object to be hoisted. A simple application of power revolves the drum, lowering the chain, and when the object is attached, a like delicate touch of the lever in the opposite direction causes the drum to revolve in the opposite direction, winding up the chain and lifting the object to the desired height. The bridge and the trolley are again started in their respective longitudinal and cross movements, the suspended object traveling in a straight line—the resultant of the two directions—from its starting point toward its destination, until vertically over the exact spot where it is to be deposited, when it is a simple matter to lower and adjust it in place. The speed of all of these movements is under absolute control of the operator, and the precision of adjustment, where delicacy of movement is required, as in the setting of cores, closing of flasks, etc., is remarkable both for its perfection and for the ease with which the operation is performed. These movements may be, and frequently are, directed from below by the finger of the foreman.

In the electric system, one or motors on the bridge or trolley are supplied with current from a dynamo by means

of an overhead wire running the length of the building. By touching a few simple levers, or hand wheels, the wheels of the bridge are caused to revolve, the trolley-car itself is caused to travel back and forth on its cross-tracks, and the grooved drum carrying the chain and hook is caused to rotate, raising or lowering the hook, all of these motions being performed either at the same time or separately, in the same direction or in opposite directions, at the same speed or at different speeds, fast or slow, without confusion, by one man of ordinary intelligence. The operators are usually chosen from the ranks of unskilled labor, and are soon taught the simple movements. The levers are so arranged that the necessary as well as natural movements of the operator are in the direction he wishes the object to go, thus relieving him of embarrassment or uncertainty.

Coast Industrial Notes.

JOSEPH SNOW, of Newtown, El Dorado county, found a diamond in his mine while panning out black sand from the riffles in the flume. It is of a light straw color, of good form for cutting, and estimated to be worth between \$50 and \$60. On Tuesday another diamond of about the same description was found at Smith's Flax in the same county by Thomas Murdock. This diamond was valued at from \$25 to \$30.

PROFESSOR W. B. RISING opened his summer school in chemistry at the State University last week. The course is especially designed for teachers and others who are engaged at other seasons of the year. There are elementary and advanced courses offered, and a certificate of proficiency will be given to those who distinguish themselves by their daily work and who pass a satisfactory examination at the close of the season.

BUTTE COUNTY is considering the proposition of borrowing or raising \$500,000 to expend upon her roads in the next three years or so. The present conditions of the roads in most valley and foothill countries, such as Butte, operate to lessen land values, make rural life undesirable, discourage production by cost of carriage to rail market, repel immigration and generally to check and stay progress. The Butte papers tell us that the county expends \$42,000 annually upon road work that is annually pretty nearly all wiped out.

COMMODORE FARQUHAR, chief of the bureau of yards and docks of the United States Navy, is making a semi-official inspection of the yard and docks at Mare Island. During his visit Commodore Farquhar will select a site for the proposed additional dock to be located at the Mare Island Navy Yard, suitable for the accommodation of the largest warships. The big dock already there has only been completed a few years, but the modern vessels are so large that it has not suitable capacity in all cases. The new dock is to be fitted for taking in the largest war vessels of modern types.

THE Harbor Commissioners have let the \$100,000 cement contract. The material is to be delivered in three lots, of 13,500 barrels each, and the bid was to be so much a barrel on each lot. The contract was awarded to the J. D. Spreckels & Bros'. Company, who offered to supply the first two lots at a uniform price of \$2.40 a barrel, and the third at an advance of five cents. J. W. Grace & Co. offered to supply the first 13,500 barrels at \$2.30 and the second at \$2.35. They made no bid on the third lot, so their offer was thrown out. The only other offer was from Cowell & Co., who offered to supply the whole quantity at a uniform rate of \$2.70 a barrel. The cement is to be used for the foundations of the new depot at the foot of Market street.

THE crusade of Labor Commissioner Watts against the violation of health laws in local bakeries is bearing good fruit. When he and his assistant, Thomas B. O'Brien, made their first tour of inspection most of the places visited were filthy in the extreme. Every law on the books which has even the slightest reference to the matter was openly violated, and proprietors were notified at once to clean their places and put them in proper condition. Mr. O'Brien has made his second visit and the change made in those places where owners were warned is radical. They are clean and well kept. In some new floors have been laid. In others whitewash and paint has been unsparingly applied, and in almost every place evidence is given that the law is to be obeyed.

Foundry Notes.

THE heavy discount on silver has a material effect on the volume of business at our local foundries. Silver mining being so depressed, few, if any, new mines are being opened, and many old ones have stopped running. This, of course, naturally lessens the demand for machinery of all kinds. We heard of an instance of a Mexican mine the other day, which was to be equipped with a plant to cost \$130,000, but when they came to figure on the discount on silver, it was to cost so many thousands more that the project was abandoned and the expected job did not come to this city. Silver mines take more machinery than gold mines, for there are pans, settlers, etc., in addition to the stamps, and with dullness in silver mining there is bound to be dullness in the mining machinery trade.

IT IS EXPECTED that the ferry steamer Tiburon, which is being rebuilt at the Union Iron Works, will be ready for service about the 20th inst., and will be put back on the ferry route between here and Tiburon. A number of improvements have been made on her. The steamer was partly destroyed by fire last New Year's day while lying at the slip at the foot of Clay street.

Interest.

TO THE EDITOR:—Is interest just? Henry George, "the San Francisco Prophet," says it is, and some other economists say the same. There are, however, some facts connected with the subject which tend to inspire distrust of their opinions. Firstly, the learned gentlemen do not agree as to what it is which constitutes the justification of interest; secondly, they offer no explanation of the obvious and undeniable injustice of some of its results.

One of them justifies it on the ground of the self-denial practiced by the creditor, who might himself enjoy the use of his wealth; another, who has perhaps observed that in many cases the creditor, or money-lender, does not know what else to do with his surplus wealth, having more than he can enjoy, and, in other cases, it is only the man's credit, not money nor goods, that is loaned, and is not thereby diminished in any sensible degree, puts it a little differently, saying that, since wealth in some forms (as in pigs, for instance) has the power of self-increase, so wealth that is loaned, instead of being invested in some such way, should also increase. He seems to forget that pigs cannot exist, to say nothing of increasing, without the conjunction of land; that labor is also necessary to profitable increase; that it would not be possible to invest all wealth in such forms; and, worst of all for him (H. George), that the legitimate gain from the increase, on the average, cannot more than compensate the ground-rent, risk, knowledge, skill and labor.

Another finds the justification in the alleged fact that the thing which one has to-day is worth more than the similar thing which one will have after a certain lapse of time, the more being interest. This, at first sight, looks like our old acquaintance, "One bird in the hand is worth two in the bush," but there is a distinct difference. The gist of the adage is the certainty of possession of the one, and the uncertainty of catching the two, whilst the money-lender usually takes good care not to part with his one without such security as ensures the subsequent receipt of more than one. When credit is given without good security the case is different; the extra return then has the justification of risk, but to that extent it is not interest, though usually included in the rate—it is insurance.

It does not seem to have occurred to this philosopher that, if that which one has to-day is worth more than that equal thing which one is sure of having in a year hence, if he shall live to have, it is equally clear, if not clearer, that what one has to-day is worth more than the similar thing which one had a year ago, and hence that the two mores produce equilibrium, nor that it may be worth something to have his wealth taken care of for a year. Money, for it comes to money at last, is not like the plane which John lent to Thomas, about which a good deal was written by a great economist, liable to deterioration by wear, or to be mislaid, lost, or broken. The man who lends \$100 on good security to-day is humanly sure of receiving the equal amount, without loss or detriment, when it shall be due. Certainly the purchasing power of money may change meanwhile; it may rise, which will benefit him, or it may fall, to his loss, but that has nothing to do with our question.

The theory of Turgot is that interest accrues to capital because a person may invest in either land or capital. If he invests in land he can get rent, consequently he will not invest in capital unless he can get a profit on capital—that is, interest. (The reader must understand that these learned gentlemen, or most of them, do not consider money as being capital.) Böhm-Bawerk sees the matter differently, saying that Turgot has confounded the result with the cause. Capital and land are interchangeable because both have the inherent power of bringing an income, whatever may be the cause of that power, so we must find the cause for capital interest in an inherent power of capital.

And so it seems, according to this German *savant*, that poor little *man* has nothing to do with it all, except to get some land or capital, and "inherent power" will do the rest. I suppose it's very disrespectful, but really I can't help laughing. I wonder how much lager beer, tobacco and gray matter were expended in arriving at that lucid conclusion! I suggest that the Professor put some "capital," say limburger cheese, in a closet and see what the inherent power will develop in a year.

The argument of Turgot, who is I assume a Frenchman and therefore wrong from a German point of view, is certainly the more practical. If he can buy land that is worth buying, he certainly can get rent, more's the pity; but I confess that the fact does not appeal to my reasoning power as a justification of interest. However, it may be that the gentleman did not mean to justify but only to explain.

The practice of taking interest is as old as history, probably much older, and the discussion of its justice may well have begun soon after the first savage who was too lazy to climb a coconut tree for his breakfast borrowed a few nuts from his more industrious neighbor, on his promise to return a greater number the next day, which promise he probably failed to fulfill unless the other savage was bigger than he, and this, or something like it, gave rise to the device of giving security enough to cover both debt and interest.

I have been reading a rather interesting book on "The History and Theory of Money," by Sidney Sherwood, Ph. D., from which I obtained some of the foregoing statements, and from which I also learn that several of the ideas which I have expressed in former letters on and around the subject of money have been expressed before by greater men. This, while not flattering to me on the score of originality, though I still claim a little, yet affords me the consolation of knowing that, in so far at least, I am not a greater fool than some of my betters.

Mr. Sherwood shows that, as a few of your readers may know, Moses forbade the taking of interest from a Jew by a Jew, though of course it was lawful for the chosen people to plunder the Gentiles whenever they got a chance. He also says that the Babylonian Tablets show lending on interest to have been common. Aristotle, he says, argued that interest was not lawful (just, or right) because money

was barren and could not produce other money. (We are in the habit of saying, "Money makes money.") The Church very early made it unlawful to take interest for money from anybody; this prohibition was afterward limited mainly to the clergy, yet it was a long time before the taking of interest was legalized for the citizens of the chief European nations.

Thomas Aquinas was very sure that the practice ought to be forbidden. Aquinas made the curious discovery that money is consumed in the using, in which it differs from some other goods—a house, for instance—and he says it is right to charge for the use of such goods as a house, but if one lets a man take money the man uses that in trade, the money is gone, there is no more use to that man in the money, its value is consumed in the using; therefore if the lender makes him pay back not only that amount but also something more, he is doing an injustice.

I cannot help wondering if Mr. Aquinas was a writer for a comic paper; if not, he ought certainly to have shown cause why the debtor should pay back even one cent of the money that was "gone."

Mr. Sherwood points out a difference between the lending of money in the Old World and in the Modern World, namely, that in the former money was borrowed mostly by needy people for their personal use, while in the latter it is, to a great extent, borrowed for the purpose of profitable investment, so, he remarks, there was more justification for the prohibition in the Old World than there was later.

As to that, I remark that the same difference exists now, not only between different countries but also between different classes of borrowers among ourselves; yet it is not practicable for the law to discriminate, whatever individuals may do.

The taking of interest seems to have been generally condemned by the greatest writers of all times up to that of the revival of commerce following the discovery of America, and especially of the rich silver mines of Peru, which raised prices enormously and gave a great impetus to enterprise; then, says Mr. Sherwood, writers began to defend it.

David Hume, about the middle of the 17th century, showed (?) that interest was not paid for money primarily, but for capital; that what the person who borrowed money wanted was not the money itself, but the instruments of production which he used in his business.

With all respect to the memory of a talented man, I beg to remark that his reasoning impresses me as being simply bosh, as much so as that of Mr. Aquinas from whose book he seems to have taken about half a leaf. When a man borrows money he does so because he wants to use it in some way, not merely to look at it, and the simple question is, ought he to pay interest?

I can gain little or no insight as to this question by reading books. Those economists who defend interest seem to have approached the subject rather with a view to finding a reason for a foregone conclusion than of probing the validity of that conclusion. Apparently they have not asked themselves "Is interest just?" but, taking its justice for granted, have simply tried to show why it exists, as Newton, seeing an apple fall, asked himself, not "Will an unsupported apple fall?" but "Why does it fall?" and, as usual, the learned gentlemen have fished in deep water for pearls of poor quality, and missed the purer gem which they might have picked up on the shore. Or is it that, like Bramah, they were absorbed in the contemplation of their own perfection, and so did not know an oyster from a clam?

It is not worth while to consider the popular fallacy that "money makes money" as a justification of interest. Let old Aristotle and Aquinas answer that. Perhaps the next most obvious plea, to the superficial view, consists in the fact (?) that interest is a simple matter of agreement between free contracting parties; that it is paid voluntarily by the debtor. In truth, however, this argument might equally apply to the case of the traveler who hands his purse to the highwayman voluntarily—under the circumstances—said circumstances being the apparition of a determined fellow and a cocked pistol, for really, in a certain class of cases, the willingness of the borrower to pay interest is the product of circumstances scarcely less convincing. The argument is applicable, however, to those cases in which money is borrowed for speculative purposes.

Another plausible justification, at least of paying if not of taking interest, is the sad plea of the borrower, that he can't get the money unless he does so. This, however, does not satisfy the ethical consideration; there must be right on both sides or there is not justice. No one blames the traveler for yielding up his purse to the armed robber, nor does any right-minded person exonerate the robber from blame.

Victor Hugo, in *Les Misérables*, tells a sad history of a mother selling her beautiful front teeth to secure, as she thought, protection for her Cosette; she could only be admired for her heroic sacrifice, the more so as her beauty was her livelihood, but that does not prevent us from execrating the villain who drove her to it, even though he had not further involved his infamy to the one-hundredth power by stealing the money.

Some writers have preferred to treat this question from the standpoint of some commodity, such as a plane or a house. I think it simpler to treat it on the basis of money, partly because interest is always stated in terms of money, and paid in money (or credit, which is the same for our purpose), and partly because we thus eliminate certain complications. But it must be understood that it is not the body of money with which we need to deal in considering the intrinsic question, but what, if I were inclined to be poetical in such matters, I might call the soul, which is credit. He that receives paper money receives the promise of the issuer, and he that receives gold money receives the promise of the world, that the service for which the money was given shall be returned. It is this "inward and spiritual grace," of which the coin or paper is "the outward and visible sign," with which we have to deal at present. Money is the representative and synonym of all kinds of service.

I shall continue this subject in another letter.

C. H. AARON.

Mining Royalties in Great Britain.

The British Royal Commission on Mining Royalties has just made its final report. This report is a unanimous one, which is all the more remarkable when we consider the apparently conflicting interests that made up the commission.

Many of the facts brought out in this paper are of interest to our mining industries and show the different conditions that exist, especially in coal and iron-ore mining of the United States and Great Britain. In the latter country much of the coal and ore land is entailed and is held by the large landlords, usually the nobility, or some religious, educational or similar foundation. The right to mine is leased on royalty.

In the United States, on the other hand, until quite recently, most of the coal and ore mined was produced by the owners of the land. In the last few years, especially in the coal mines of Pennsylvania and West Virginia, and the iron-ore mines of Lake Superior and other regions, an increasing amount of coal and iron is mined on royalty.

In Great Britain the time limit of mining leases varies from 21 to 63 years. A fixed rent is usually payable, merging, however, into the royalty rent. Royalties are generally a fixed sum per ton, but sometimes they vary with the price of coal. Where the amount payable for royalty upon coal raised in any year is less than the fixed rent, the difference is known by the term "shorts." Lessees often have the right to work out coal paid for as shorts in subsequent years. Sometimes a lease contains a power to surrender, and, as a rule, a lessee is prohibited assigning without the permission of the lessor. Special prominence is given to "wayleaves." A wayleave is a leave to pass over or under land not included in the mining lease. For this leave the owner exacts a payment, generally of a penny per ton, but he has the right of refusing any leave whatever.

The estimated total royalty payable in 1889 on coal was just over £4,000,000, and the estimated wayleave charges were over £200,000, making a total of £4,200,000. Taking the total output for the year as 177,000,000 tons, the royalty and wayleave is equivalent to rather more than fivepence per ton. As regards iron ore, the royalty is estimated at £561,000 on 14,500,000 tons, about 9½d. The estimated royalty for all other metals—e. g., copper, tin, lead, etc.—is estimated at £87,068.

But little information as to the amount of royalties paid in the United States is available. All coal mined in the Flat Top (W. Va.) region is mined on a royalty of 10c a ton, and this seems to be the usual rate in the bituminous mines of Virginia, West Virginia and Pennsylvania. In the Connellsville region there are some royalties as low as 7c a ton and some as high as 11c, but 15c a ton of coke, which is equal to about 10c a ton of coal, is the usual royalty. In the anthracite region the royalty is much higher than this; 20c is not unusual, even 40c has been paid.

Iron ore royalties vary greatly, but 20c to 30c a ton is not unusual. In the Mesabi range 40c and even 65c is paid, and 40c is not uncommon in other districts. Leases are usually made with a minimum amount to be paid each year, and, so far as we know, no "shorts" are allowed. There are leases, however, that provide for reductions in the tonnage royalty when the amounts paid exceed a certain sum.

The leading objections brought out by the British Royal Commission to the system and methods of that country were (1) that royalties were too high, (2) that "shorts" and unexhausted improvements are confiscated, (3) that the restraints and alienation and surrender of mining leases are too severe, and (4) that the powers of land owners enable them to exact heavy wayleaves. Further, it was alleged that copy holders abuse their rights, and that the powers of limited owners to lease their mining property was not sufficiently extensive.

The result of the inquiry is that the commissions do not think that any legislative interference with the amount of royalties is desirable, though they recommend the general adoption of the principle of varying royalties by a sliding scale, but they recommend the establishment of a tribunal for dealing with wayleaves; they approve of the organization of a Department of Mines in connection with the Home Office; they think greater facilities for leasing mines should be given to corporations and life tenants; and they further recommended that the power possessed by copy holders and surface owners of preventing minerals being worked should be checked.

Incidentally the question of the nationalization of minerals was raised, but it did not meet with much favor. The miners' representatives did not favor it, and the commission reported:

"No suggestion in favor of the nationalization of minerals was made by any of the associations representing lessees, and those witnesses whom we examined on behalf of lessees who were questioned on the subject expressed a decided preference for the present condition of the law of mineral property. In these circumstances, and as the nationalization of minerals is only a portion of the larger question of the nationalization of land, we do not consider that it is necessary to discuss the matter further."

At Floriston, Meadow Lake township, Nevada county, the new mill will soon be running at its full capacity. An 80-horse-power donkey engine has been ordered with which to log, particularly to snake logs from the most abrupt mountain sides to the shutes on the top of the mountain. The mill will cut snowshed timber for the S. P. Co., in addition to the manufacture of lumber for market. Some improvements are being talked of to increase the cutting capacity of the mill so that it will cut 40,000 feet per day. Mr. E. G. Sukeforth will have charge of the mill, while the mill has been leased by Mr. Sukeforth and S. H. Simonds. Mr. Bixby, an old experienced logger who has been logging in the Redwoods and in the Puget Sound country, will have charge of the logging camp.

The Mines at Angels, Calaveras County.

From Our Own Correspondent.

TO THE EDITOR:—Angels is to-day one of the best mining towns on the mother lode; at the same time it is not what it will be or might be at this time. Merchants and landlords all complain of dull times from an excess of stores, hotels and saloons. The trouble, however, is not so much the overtrading as it is the class of miners employed. These are largely Italian, Cornish and Austrian—good miners, but of little benefit to a mining town, as they spend but very little of their earnings, and that among themselves. If the mines were manned by Americans who would build homes, make their permanent residence in the town, and invest their earnings in local enterprises, and in surrounding their families with all the comforts that the American will have when his purse will afford it, Angels would boom in trade as well as mines. At the same time there is a large volume of trade, and it is only a question of a short time until, with the steadily increasing population, Angels will be the mining town of the State. The closing down of Nevada's mines has set adrift a large number of miners who drift all along the foothill mines of this State in search of employment. Angels is overrun with them. Many of these men are of no account, while among them are some first-class miners and deserving men. I met a miner at the Gladstone mine, Shasta county, who had walked there from Nevada. A few months later I met this same miner near the Sheep Ranch mine, in Calaveras county. He informed me that since last seeing me he had footed it up through the mines of southern Oregon, then back and down through Del Norte, Siskiyou, Trinity, Shasta, Butte, Nevada, Placer, El Dorado, Amador, across the lower part of Calaveras, through Tuolumne and back across Calaveras to the point where I met him, and had failed to find a job. Now he was a hale, hearty miner, a man of more than ordinary intelligence, and acquainted with many of the mining superintendents along the route he had taken, but he had failed to find a day's work. I presume this is but a sample case. If this or any other miner would remain in one mining town until they were known and found reliable, I doubt their having to move on. It is to be hoped that the starting up of the gravel mines will in some degree absorb this vast army of unemployed miners.

Few would believe how great their number is, and unless some employment is afforded them, it will be but a question of time until crime will follow on this track, for men must live, honorably if they can, but live they will. The furnishing of employment to this vast number of unemployed miners is a question that should interest every mining man in a solution of this grave question. At a distance it may seem exaggerated, but all along the roads, and in the mining towns, I meet miners who ask me where they can go to find work, while every mining superintendent states that he is overrun with miners seeking work; that they offer to work for their board, and that the number is constantly increasing. Angels seems to be the Mecca to which they drift, only to find every mine full-handed.

Angels, as is well known, is on the mother lode and the mine owners all claim to be on the *true* mother lode. They remind me of Sam McMaster when I asked him how wide the Homestake vein was at Deadwood and he replied, "I've been across the country for 80 miles and haven't found either wall." The mineral zone at Angels is about three miles wide. In this belt are a large number of developed and undeveloped mines, though the greater portion of the ground is held under agricultural patents and used as a stock range. The mother lode affords a very interesting study that grows in interest as you follow it up. It has been the lot of the writer to travel up and down on the line of the mother lode and to inspect the leading mines on the vein for years past, and while much has become an "old, old story," there is constantly new features cropping out that open up new fields for investigation and serve to keep the interest from flagging. It is pretty generally admitted that there are two veins while there is no doubt about the value of either. The lode is only credited with a length of 80 miles, but can undoubtedly be located for almost twice that distance. The main, or eastern vein, is usually found near the apex of the hills, through which it courses; while the west vein lays along the base of the hills to the west. In consequence of their location the country rock over the eastern vein has been greatly shattered and numerous gash veins and "quartz crossings" have been formed which, as a rule, are the source of the pockets on the mother lode.

The west vein is covered by the overlying hill and holds its wealth within its walls and is generally a good milling proposition wherever an ore shoot can be found. The vein's appearance varies with the formation through which it passes, and in consequence while in the talc and porphyritic green slates of Mariposa, Tuolumne and Calaveras, the vein is made up of irregular parallel plates of white compact quartz mixed with green talc. This is given as the auriferous portion of the lode by Prof. Whitney, but active working does not prove this to be the case, as the greater portion of the gold extracted comes from the talcose slate bodies that accompany the white quartz and are found on one or both walls. At Angels there is found both the talc slate veins and also the ribbon quartz of Amador county mines.

The talc veins cross Angels, while the black graphite slate belt of the ribbon quartz is about one-half mile west. In Angels the mother lode strives to give all a choice for a location and spreads out like the ribs of a fan with occasional crosses. The main branch of the mother lode comes up from Carson to Angels' creek, with a stony cropping. At this point it drops out of sight. Once across the creek it crops boldly into what is known as the Johnnie Meyers mine, and then runs north through the Coleman property; crosses above Altaville and runs under the gravel on McElroy's old gravel claim. The slate through which the vein passes can be found at the foot of French Gulch, about a half a mile above Dogtown and several miles north of Angels. All along the east of this vein there has been worked

from the early history of the town to the present time, successive strata of mineralized talc slate. In this section is the well known Utica mine which occurs as a gash vein, but proves none the less valuable. At Angels creek another branch crops boldly with the Madison, Gold Cliff and Suffolk mines on its course. By some it is contended that the lode makes an abrupt angle and turns from its course at this point, instead of dipping under, and that the true vein is that on which the Madison is located. West of these veins and swinging rapidly to the west, are a number of veins which are, no doubt, connected with the mother lode if not on it, while about a half a mile distant is a strong vein of ribbon quartz that looks like the *true* west branch of the mother lode.

In Amador and El Dorado it would be called the true lode. Between these ledges and beyond them for a width of three miles are mineralized bodies of talc slate and numerous quartz ledges. The whole section might well be called one vast segregated vein. In consequence of the great area here mineralized, the future of this section is one of great possibilities. The average of the ore is low in grade but easily milled, and the solution of the future working of this immense belt to a profit is in a large number of stamps with competent and economical management.

THE UTICA MINE.—Hayward, the Hohart estate and Lane are proprietors of this property. It is the leading one of the town. The plant is extensive and embraces a complete water system known as the Union Water Co.'s ditch and reservoirs, the Utica and Stickle mine, with the Angels Chlorination Works. In addition to the company's two 60-stamp mills they have their own sawmill, machine shops and silver-plating works, making a very extensive and complete plant. The Utica Company is also interested in other mines in the camp, all of which are under the charge of the genial owner Charlie Lane. The Utica mine proper is in charge of Mr. Lane's son Thomas. The mine has two shafts—600 and 900 feet deep—with a 60-stamp mill run by water-power. The mill is in charge of Mr. Hayward's old millman, John Reeves, and is run "like a clock." Nothing has been omitted that can in any way improve the working of the mine or mill. The 60 stamps feed their ore over long stretches of plates. The pulp then passes to the 24 Frue concentrators and thence a half-mile down the creek to a large building with a floor of canvas, where the finer mineral that escapes from the concentrators is caught. The air-compressor is one of the largest in the State and furnishes power for all the drills in both the Utica and Stickle. At the shafts the Fuller skips and safeties are used. The ore-skip dumps its ore in such a manner that it is impossible for any of the ore to fall back into the shaft. The water skip discharges its water through a side-valve, thus allowing the skip to hang vertical at all times, and not only saves wear but prevents accidents. Over the skip is placed the Fuller safeties, which, since they have been in use, have saved the life of the manager, Chas. Lane, and that of a number of miners. This safety acts on the parachute principle and is positive in its action. The least drop of the skip at an unusual speed causes the parachute to rise and instantly engages the dogs. The safety, however, has a feature peculiar to itself in this: that the miner on the skip can instantly stop it at any point in the shaft. If there is ever a law enacted compelling all mines to use safeties, as there is now for car-couplers on railroads, the Fuller safety will, I think, be the one adopted.

A NEW HOIST.—On the Stickle the old hoist has been removed and sent up to the new purchase at Shingle Springs, El Dorado county. In its place a hoist to go 2000 feet is now in operation. This hoist is from the works of Demarest & Fuller of Angels. While there are very fine hoists on both of the Utica shafts, this hoist on the 900-foot shaft of the Stickle is far superior, and I doubt its being excelled by any hoist in the State. It is run by water power and operated by two small hand levers. The hoist seems out of proportion, with its immense gearing and the slight, simple lever system that opens and shuts the water valves, and is in striking contrast with the usual array of heavy levers and brakes that look confusing to the uninitiated. This hoist is attracting the attention of mining superintendents throughout the State, and will no doubt be duplicated elsewhere. The shaft is equipped with the Fuller skips and safeties. The mine is connected on each level down to 900 feet with the south shaft on the Utica. The mill is a 60 stamp, and is in charge of James Leonard. The mill is Mr. Hayward's latest, and in the mill as well as in the hoist everything is of the latest improvement and best patents at this time. The plan of the mill differs somewhat from that of the Utica, and, taken as a whole, can hardly be improved upon.

For this mill several forms of concentrators were given a thorough competitive test, and the order given Demarest & Fuller for 16 Tullock concentrators to fill out the mill's equipment. These concentrators have been fully described in former issues of the PRESS, but have been greatly improved in almost every way by Messrs. Demarest & Fuller, until, in the opinion of those in authority, at this time, their capacity is the greatest, product unusually clean, loss the smallest and cost the lowest of any machine tested.

THE ANGELS CHLORINATION WORKS.—This is an extensive and complete plant, consisting of two ovens, each 14x80 feet, with a daily capacity of eight tons. The works are in charge of Mr. T. M. Smith. It is reported that the cyanide process will be tested on the sulphurets of the camp at the chlorination works, and, if found a success, that a cyanide plant will be erected. It is well known that Mr. Hayward's motto is, "D— the per cents! Give me the dollars and cents," and should he adopt the cyanide process there will be no further doubt of its working success.

THE MADISON MINE.—T. Lane is superintendent and Naylor Williams foreman. This mine is the property of Mr. J. T. Lane and is being developed under bond by Messrs. Hayward & Lane, who have secured this and a number of adjoining mines. The shaft is being put down as fast as men can sink it, and is now 800 feet deep in the

footwall with crosscuts of 30 feet at each level to the vein. The shaft is put down a hundred feet, when the mines in the drift above come down to start new drifts, which are continued until the next 100 feet is sunk, when the drift is left and the miners go down to the next level. Every effort is made to crowd the shaft down. The ten miners in the drifts keep the 20 stamps dropping steadily. The ore-body milled is about 20 feet wide. The white quartz is left standing as a hanging-wall, being barren of mineral, Mr. Hayward believes that "no footwall, no mine," and is sinking to get a footwall to suit him and have the mine so thoroughly developed that, once they start milling, they will have sufficient ore in sight to keep 100 stamps dropping. This is the only way to operate on the mother lode at Angels or elsewhere. These companies that buy mother-lode mines, and at once set up a mill and expect dividends from the grass roots, are in the wrong location and business as well. Every mine on the mother lode should be given two years of pushing development before erecting its permanent mill, and the owners should expect to put in the mine all the capital needed for another year before expecting any returns. Under practical mining superintendents' charge, few mother-lode mines will fail to yield very satisfactory returns when thus managed.

GOLD CLIFF.—J. Woodson Garrard is superintendent of the Gold Cliff, which is opened about 75 feet across the vein by a crosscut tunnel and a large open face at the mouth of the tunnel where the ore is quarried out 75 feet across and 100 feet high. Mr. Garrard keeps the 20 stamps dropping at a cost of 65 cents a ton for mining and milling, and could reduce this if he had the 100 stamps the mine would supply. The mine is under bond to Hayward & Lane.

BROWN, SMYTHE & RYLAND MINING CO.—C. D. Smythe is superintendent of the group of mines which was formerly known as the Suffolk. At this time a crosscut tunnel is being driven to drain the surface water. The mine has been worked in former years, and the quartz I found to be the highest in value of any mine in the camp, but rebellious in character. It is Mr. Smythe's intention to test by pan amalgamation and the cyanide process.

ECLIPSE.—The Eclipse, T. E. Flagg superintendent, is about a mile west of Angels and just east of the old Osborn mine. The old shaft has been stopped, and Mr. Flagg has put down a shaft north from which he is cross-cutting through very hard rock, and is in about 100 feet in talc, slate and quartz, all of which is considered good milling ore.

GOLD HILL MINING CO.—S. V. Ryland is general manager. This is the old Osborn mine, and is located about three-fourths of a mile west of Angels. The mine is opened by a series of shafts, crosscuts, drifts and open cuts. At present a fine shaft is being put down north with levels run to the veins, which so far show 15 and 20 feet of milling ore. On the surface the entire hill is mineralized, and its earlier workings produced over \$100,000 in heavy gold. Mr. Ryland has purchased at Denver a complete cyanide plant, which he expects to erect soon in addition to the present ten-stamp mill. The owners are Chicago capitalists.

COLEMAN'S MINES.—These mines are in charge of Mr. Coleman's friend, Mr. G. H. Fox. The property is very extensive and is said to be evenly mineralized throughout. At present a few tributaries are taking out ore from a point at the north end of the mine. Every now and then it is reported that Mr. Coleman will start the mine, but so far he has not done so. With the large area to draw on the mine could keep 500 stamps dropping steadily.

THE PIONEER.—D. D. Demarest, owner—is being pumped out, and once it is open for inspection capital will investigate and if satisfactory, invest. This property carries the largest per cent of sulphurets of any mine in Angels and, if developed, should prove a good mine.

THE DEMAREST MINE.—D. D. Demarest, proprietor—is in the Hawkeye district, about five miles west of Angels, and on the mother lode. The mine is opened by a 120 foot shaft. The vein is from two to five feet in width that has milled \$12 per ton. In the bottom of the shaft an additional vein is coming in that promises equally well. The mine is a very fine prospect and is for sale.

THE THORPE MINE.—Moses Thorpe, owner—is near the Demarest. The shaft is down 107 feet with a drift run 140 feet on a vein that goes \$6 to \$16 a ton and is from five to ten feet wide. There is an old relic of a mill and hoist on the mine.

CHEROKEE.—B. R. Prince, owner.—The Cherokee is about one-half mile N. W. of Angels and was a very rich mine in heavy gold having a variously estimated value up to \$800,000. It is a difficult matter to determine the amount. Mr. Prince took out one pocket of \$60,000 after he came into possession. A fire destroyed a miner's cabin while the miner was down in the mine and in the ashes was found an old-style square 10-pound lard can filled with gold. Just how much more was appropriated in this way it is difficult to determine. Mr. McKenzie has a bond on the mine and will no doubt take the property, as his work shows on the east end a large body of good milling ore in addition to the showing at the shaft.

THE CALIFORNIA CONS.—Curtiss, Hendricks & Atkinson, owners—is west of Angels about one and one-half miles. It is opened by a crosscut tunnel, 320 feet long, that cuts the vein 110 feet deep. The vein is here 65 feet wide, of fine ribbon quartz similar to the mother-lode mines of Amador county. There is a shaft down on another vein five feet in width, and a tunnel on the opposite side of the hill cutting another vein 12 feet wide. The mines cover four full claims of 600 x 1500 feet each. If this mine had a shaft 1000 feet deep there is everything to show that it would prove a fine property and start a boom on this branch of the mother lode at Angels.

THE JOHN L., owned by S. V. Ryland, joins the California Consolidated on the south and is opened by a shaft 70 feet deep on a 12-foot vein.

BREUNER, BOLITHO AND GRAHAM.—These three mines have been bonded by J. M. Breezen for Denver capitalists. The Bolitho shows very rich rock spangled with gold.

Sufficient work has been done in the past on all of the mines to show them to be good propositions.

CARSON CREEK MINING CO., E. W. Roberts superintendent, is the old "Doc Jones mine," and is located on the west branch of the mother lode on Carson creek and about a mile west of Carson. The shaft is now down 300 feet with crosscut run 70 feet and no wall reached. The ore in the bottom of the shaft carries silver tellurides and gives the mine the highest silver record of any mine on the mother lode. The free gold is small in value, but the high-grade sulphurets more than make up for this. On the hanging-wall there is a vein carrying 30 per cent of iron sulphurets that go \$90 a ton, while the foot-wall vein carries silver telluride and sulphurets that go \$950 a ton. The per cent of silver is from 25 to 50 per cent of the value. The mine is equipped with a 40-stamp mill running under 350 feet of water pressure. Everything would indicate that the Carson Creek was not only a coming but a present mine of great promise, and under the present efficient superintendent will, when thoroughly developed, prove one of the leading mines of the district. The property is owned by Porter, Remington & Gates, the well-known paper manufacturers of New York.

THE ALLISON MINE.—Robert Allison is owner of this mine. The property is 600x300. It joins the Carson Creek on the south. The mine is opened by a crosscut tunnel that shows a fine-looking ledge on the foot-wall to the south. The tunnel has been extended 45 feet across the vein through gangue matter and the hanging-wall not reached. Mr. Allison has been given very high returns both from the vein and gangue. The position of the mine is such that it should, when developed, show ore similar in value and character to its neighbor, the Carson Creek. The mine wants a 500-foot shaft and crosscut and is open for investment.

There is nothing doing at Carson. Over on the river the Calaveras Con. G. M. Co. is said to have settled its differences and will soon start up. E. H. SCHAEFFLE.

What Is Lignite?

A correspondent of the *Colliery Guardian* says: The answer given to the above question by "M," in your January issue, is an admirable resume of the distinctions between lignite, or brown coal, and bituminous coal, as to physical and commercial characteristics.

Mr. Symington, in your April issue, asks "the dividing line between lignites and so-called bituminous coals as shown by their commercial analysis." To illustrate his meaning he gives four analyses, saying that one represents the composition of a coal from true carboniferous measures (presumably bituminous coal), the other three being analyses of cretaceous coals (presumably lignites); then he asks, "Which are lignites?"

It is quite impossible to tell from the analyses given which are lignite. In fact, the ordinary commercial analysis, reporting the composition of a coal in terms of water, volatile matter, fixed carbon, sulphur and ash, entirely fails to give any data for forming an opinion on this point.

The distinction between lignite and bituminous coal, aside from the physical differences of structure, color, and weathering qualities, is based upon the amount of oxygen contained therein, exclusive of ash and water.

It is now generally accepted that all coals consist chiefly of oxygenated hydro-carbons, with, in some instances, a small percentage of hydro-carbon containing no oxygen, and of pure carbon.

The mechanically combined water and the ash, depending, as they do, upon the local conditions attending the deposition of the coal, are eliminated from consideration in determining the mineralogical character of a coal.

Drying the sample of coal at 100 degrees C., and subjecting the remainder to ultimate analysis, and obtaining the result in terms of hydrogen, oxygen, nitrogen, carbon, sulphur and ash, we have the data for determining the mineral character of the coal.

Thus analyzed, a bituminous coal will yield from 5 to 15, rarely as high as 17, per cent of oxygen, while a lignite will contain from 15 to 36 per cent.

Strictly speaking, while the terms lignite and brown coal are usually used interchangeably, and do indeed refer to chemically identical substances, the use of the word lignite should more properly be restricted to that form of brown coal which retains the fibrous structure of the original wood.

Krupp's Workmen.

An interesting account of the methods pursued by the proprietors of the great Krupp foundries, at Essen in Germany, for the benefit of the workmen employed there and their families, is given in a recent number of the "Annals of the American Academy of Political and Social Science." The following is an abstract of the paper:

The Krupp works employ 16,000 men, and with their families, numbering over 50,000, constituting the bulk of the population of the town of Essen, while over 3000 are located at various branch works, and the total number benefited by their numerous charitable and philanthropic enterprises is estimated at 25,200 workmen, and with their families, 87,900 persons. The Krupps themselves say that their numerous institutions for their workmen and their families are based first on their own business interests. Their successful efforts to raise the condition of their workmen have been made in various ways. The Krupps have built over 4000 houses—from frame dwellings of two rooms, renting at \$15 a year, up to six-room houses, renting at \$80 a year; they have expended over \$3,000,000 on them, earning about two per cent on the investment, but this, with much more, has been spent in benefiting the working population in other ways.

The co-operative stores, managed by the Krupps at their own risk, include 15 retail grocery stores, nine branch stores, with one main store for general merchandise, a shoe factory with three stores, a hardware store, a mill and bakery with three bread stores, a slaughter house with

seven retail meat stores, two clothing establishments, seven restaurants, a wine store, an ice company, a coffee-roasting establishment—in them nearly 500 persons are employed, widows or daughters of workmen. There is a boarding house for the unmarried workmen, where lodging and food are supplied at 20 cents a day. In 1870 Alfred Krupp Krupp built a hospital for sick and wounded soldiers, and since the Franco-German war it has been used for their workmen and their families—they are cared for at the price of 38 cents a day for men, 30 cents for women and 25 cents for children. There is a large bathing establishment, where 6000 free baths were given last year, and bath tickets are sold for 2½ cents apiece. The insurance funds against accident and death and for pensions have been largely supplemented by the Krupps, in addition to the strict requirements of the German laws. Primary and advanced and technical schools are maintained by the Krupps, who say that all this is done to enable them to extend and improve their work by making their workmen sharers in their prosperity.

Comparison of Fans in the Ventilation of Coal Mines.

The very effective work now being done by different ventilating fans shows that furnace ventilation is going, gradually but completely, into disuse. At the present time very great attention is being given to the question of fan ventilation by engineers, and different constructors are pressing forward their claims to the merits of their fans.

One of the machines which has of late been introduced at English collieries for ventilation is that of Noel Chandler, which is a high-speed fan worked by the direct action of a quick-running engine. The fan is constructed of blades, having a modified form of S—the inner end being curved forward in the direction of rotation. According to the *Transactions of the Mining Institute of Scotland*, one of these fans 6½ feet in diameter and 2 feet 5 inches wide, at 265 revolutions per minute, gave at a recent experiment a quantity of 49,896 cubic feet of air per minute, with a water-gauge of 1.1 inch. Another of these fans, 10 feet diameter and 5 feet wide, worked by an engine of 26 inch cylinder and 13-inch stroke, at 867 revolutions per minute, produced 58,791 cubic feet of air per minute, with a water-gauge of 1.6 inches. In this case it was calculated that the useful effect of the fan was 70.13 per cent.

The Rev. G. M. Capell, who is an expert mechanical engineer, calculates that his fan will give a useful effect of 80 per cent. One of his machines now working at Prosper I colliery, Germany, is a 12 foot 3 inch double inlet fan, driven by two engines coupled, each 20½ inches by 32 inches stroke, with Rider expansion gear, giving up to 450-horse power. Another of these fans is working at Kingswood colliery, Bristol, which is 11 feet diameter, giving 61,560 cubic feet of air per minute with a water-gauge of 4.7 inches.

One of the Rateau fans, which is erected at Montrambert de la Beraudiere, 9 feet 2 inches diameter, gives 75,462 cubic feet, with a water-gauge of 2.7 inches. Mr. Capell, in comparing his with this, says he has fans giving 70 per cent of manometric effect at high gauges, but does not advise such high manometric effect. In experiments by the North of England Institute of Mining Engineers it was found that the Guibal fans gave the highest useful effects with from 52 to 54 per cent of manometric effect, which corresponded with his experience. With low speeds and high manometric effects the strain on the fan-shaft is greater. That this is the case Mr. Capell says is borne out by the report of the commission, for while the cost of lubricating the fan at Prosper colliery, giving 99,590 cubic feet of air at 6.10 inches water-gauge and 95.79-horse power in the air is only 0.15 franc a day, the cost of lubrication of a Rateau fan at Rieu du Cœur colliery, passing 46,615 cubic feet at 2.83 inches water-gauge or 20.83-horse power in the air, is put down at 0.65 franc per day. On these matters should be taken into account in making comparisons. To get a fair comparison of the actual results of different fans, a test committee should be appointed to experiment with the different fans to be tried, which should be placed under the same conditions, in the same fan casing, and be worked by the same engines.

HARDLY has the South Gila Canal Company commenced the great work of damming the Gila river and building a canal 125 miles in length, through one of the best portions of Arizona, and before the Sonora Canal Company has completed the survey for its canal in California, when another project of the utmost importance to Yuma and the great area of arable land lying to the south and east of Yuma, in Arizona and the Mexican State of Sonora, is inaugurated. The plan is to dam the Gila river at the gorge, twelve miles east of Yuma, and create a reservoir thirty miles in length and eight miles in width. The dam which will be of solid masonry, is to be 4500 feet in length and 110 feet high. It will extend from the mountains on one side of the Gila, to the opposite bank on a reef of bed rock where three small islands rise out of the bed of the stream. These islands will form abutments to the dam which will be built with such a slope as will carry the water away from the dam without cutting or wearing away the rock at its base. The flume, or canal, which will conduct the water away from this reservoir to the lands to be irrigated, will not be over a mile in length. From the end of the flume to the south and west, canals will be constructed over the mesa and valley lands in different directions when the lands, which all belong to the United States Government, are settled. The reservoir, it is estimated, will hold water enough to irrigate the 3,500,000 acres of land lying to the east and south of Yuma, which extends into the Mexican State of Sonora, and will also furnish water for 100,000 acres of the Sonora Land Company, lying between the dam and Colorado river, in the valley of the Gila. It is estimated that the dam alone will cost \$5,000,000, and that it will take two years to complete it.

South African Gold Mines.

South African gold shares are decidedly that class of security which amid the general depression of the stock and share markets offer by far the most tempting opening to purchasers. There are many reasons which combine to attract the public in this direction, says the London *Mining Journal*, apart from the actual position of the shares themselves. Australian affairs are so exceedingly gloomy as to discourage all speculation in that quarter, while elsewhere the blighting influence of the silver evil is severely experienced. Our South African colonies have never been guilty of the financial recklessness of South America and Australia, and there is a backbone of settled population there to support the new development of enterprise. Moreover, even the financial world has a Carlylean faculty of "hero worship," and imagination has been stimulated by the magical personality of the Cape Colony Premier, De Beers amalgamator, Chartered Company promoter, and Uganda telegraph constructor. In the absence of any reasonable prospect of an upward movement in other classes of scrip for at least some time to come, it is not, therefore, remarkable that South African enterprises, mineral and others, should be displaying so much animation. We believe, however, that the revival is based upon a much more solid and permanent cause than the general difficulty in finding channels for speculation. For a long time numerous prophets have been pointing, almost unheeded, to the revolution which has been effected in the methods of gold mining on the Witwatersrand, to the reforms which have taken place in company organization and personnel, and to the change in public policy which is reducing the cost of production. If the first Randt "boom" was the outcome of ignorant credulity, that which is now developing is the product of scientific assertion gradually working upon public scepticism. The most eminent mining experts have not hesitated to couple the acutest geological theories with the most glowing accounts of the Randt's future. The reef is of enormous extent, with ore poor in gold but remarkably uniform in character. There is thus the prospect of the development of the most surprising gold mining enterprise the world has ever seen—of an auriferous industry carried out on the same gigantic scale and with the same huge plants as the working of a coal field. In another couple of years the Randt alone may be producing £10,000,000 worth and thus by adding 50 per cent to the world's supply of the precious metal it will be solving one of the greatest economic problems. It is surprising to see the Randt output attain in March so heavy a total after the widespread stoppage of work caused by the floods in the previous month, and there can be no doubt that the general additions and improvements to plant which have resulted from that calamity will bring about a brilliant advance upon all previous records in the early future. The new developments which are taking place on the Randt are not confined to the extension of steady and scientific work to the deep levels. All the principal mines are now equipping themselves with rock-drilling plant, electricity is being generally used for lighting and power transmission, the value of the cyanide process has been conclusively proved, and is being generally adopted. Claims which, when formally worked, failed to pay under the disadvantages of exorbitant purchase money and wasteful methods are again being developed. The reported discovery of coal in the west Randt seems to open up a more promising future for the mines in that direction. Enterprise is again reviving on De Kaap field, while other new auriferous deposits are opening up all over the Transvaal. The new Silati railway will afford the possibility of profitable exploitation to mines of which most satisfactory accounts are published. As to the external influences of the gold mining industry few operators in the "Kaffir circus" probably have any conception of the extent of the change which has been wrought. The railway from the Cape Colony has had the effect of reducing appreciably the cost of mining materials in Johannesburg and by facilitating supplies has abolished altogether the temporary inflations which at one time were the rule in all commodities. This effect will be further exhibited when the railways, now in course of construction, are completed from Natal and from Portuguese territory. The labor question is still a difficulty, but it seems likely to vanish beneath one or both of two solutions—the one the compound system, the other the increased importation of white miners. As it is the reduction of liquor licenses in Johannesburg has done much to improve the position of the mining industry in respect to this important factor of labor. A further decrease in the cost of mining is promised in the abolition of the dynamite monopoly and the proposed cheapening of cement. There are, thus, many reasons why mines which have not hitherto paid dividends should be capable of remunerative working under these altered conditions, and it is not wonderful that prices should have risen, and that fresh capital should be asked for. Outside the Transvaal the gold mines of Mashonaland are attracting the most hopeful attention. The explorers are themselves thoroughly impressed with the auriferous value of their territory, and the more investigation is extended the more encouraging the reports become. It cannot be doubted that Mashonaland as a gold country has a big future before it. In Zululand promising work is being done by a syndicate, and a most eminent mining expert has reported very favorably upon several deposits in the Mozambique Company's possessions. The mineral wealth of South Africa is indeed magnificent, and British enterprise will find a wide field therein for a long time to come. Prospects are so far superior to those afforded in the history of any previous auriferous development in that the country's gold mines lend themselves to a business-like and extensive pursuit of the industry not hitherto possible. The element of speculation ought to have less to do with South African gold mining than it has had to do with the winning of the precious metal in any part of the world. So long as the purchaser of shares is sure that a sufficient capital is available for honest development work, it is hard to see where he can hope to find a better opportunity for a sound and remunerative speculation than in South Africa.

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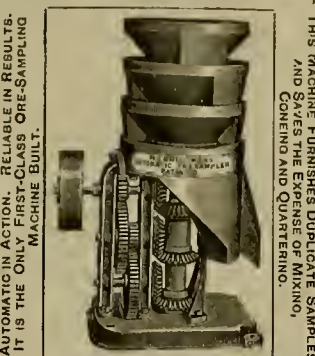
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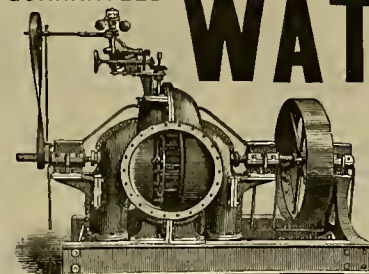


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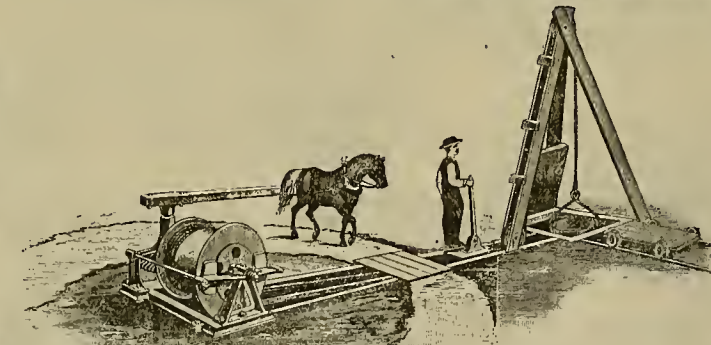
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Scientific Progress.

Possibilities and Impossibilities of Science.

Professor A. B. W. Kennedy, F. R. S., delivered a lecture in the Royal Institution, on "Possible and Impossible Economies in Energy Utilization," a subject which he described as of national interest, as economy in energy might mean wealth and prosperity to a nation, while waste in energy might mean diminished commerce and general depression. As an engineer he stood on the firm basis of the fact that nothing was impossible except perpetual motion and the transmutation of metals; and about the latter it was hardly safe to be sure, for Professor Dewar might shortly tell them that at a temperature of about 273 degrees everything was the same, the difference between gold and lead being only a matter of thermodynamic function. In essence, all the impossibilities he would have to mention were perpetual motions—attempts to get more out of something than was in it. He gave, as instances, the attempts to utilize the steam in an engine over and over again, and to make out of coal a fuel which had twice the value of the coal itself. A man who said he was going to produce 25 out of £1 would be laughed at. To the good folk who dabbled in physics and chemistry and patents, it was always possible to conceive that some new law, or force, or source of energy, or what not, would rise, Minerva-like, fully equipped for the use of the universe, and particularly for making their individual fortunes out of a casual suggestion or a random experiment. He thought it was not impossible to arrive at some understanding as to how far existing knowledge could be held to be final, and how far provisional. More than half the possibilities of economy were possibilities of improving up to the best work already done. If, for instance, the average working of steam boilers all over this country were brought up to the standard of the best working, about 30 per cent of our coal would be saved. He analyzed the working of electric-light plant, compressed-air plant and electric-tramway plant, as well as steam and gas engines, and said there was no very large possibility of saving in the generation of electricity, but there was an enormous possibility of economy in utilizing the current for light in the lamp itself. He also emphasized the importance of super-heating steam. To sum up, there seemed to be no very startling possibilities before us except in increasing the efficiency of electric lamps and bringing up gas engines to their theoretical maximum. In other respects, matters would develop more or less rapidly, but always less and less rapidly as they approached the limit of efficiency. There was no one point in which we had not some measurements enabling us to set bounds to the possibility of improvement, and thus to gauge the value of the pretensions made by each new method or invention as it appeared.—Electricity.

PROF. DEWAR gave the second of a series of lectures at the Royal Institution, London, recently on the atmosphere. His first point had reference to the presence of metallic particles in the air and the manner in which they were disseminated. There was a theory that they were caused by cosmic dust. In volcanic eruptions they had been carried to great elevations, especially in Krakatoa. Turning to the subject of pressure, he pointed out the value of mercury in this respect, remarked that air is 10,000 times lighter than mercury, and then conducted an interesting experiment to show that an air barometer is sensitive to atmospheric pressure to a millionth part of an inch. He then demonstrated that in the same way as they could measure atmospheric pressure they could measure gases, coal gas, for instance, being lighter than air and carbonic acid heavier. This brought him to the question of the effect upon air when it has been evaporated into it a substance such as water. On this point he had an interesting method of showing the difference between air saturated with water as compared with air in the lecture theater, the result being to establish the fact that air charged with aqueous vapor is lighter than dry air.

ALTERNATING CURRENT PHENOMENON. Mr. Maicillac, in *La Lum. Elec.*, describes the following experiment, which he believes confirms to some extent statements made by Mr. Tesla regarding the effect of surfaces: A small Geissler tube, 4 to 6 inches long, has one end connected to one pole of an ordinary Ruhmkorff coil, while the other end has the platinum wire filed off close to the glass, the second pole of the induction coil being disconnected and insulated; below the

free end of the tube is placed a porcelain dish insulated by a plate of ebonite placed on a large plate of glass; the end of the tube is then lowered until it touches the liquid; if then the finger of the hand is touched to the liquid the tube will glow; if, after the light is once established, the finger be withdrawn the light will diminish, but will still continue; if then, while thus disconnected from the water, the hand is brought near to the free end of the tube the luminosity will remain almost as intense and will have the same rapidity of vibration; if the end of the tube is then again lowered into the liquid the luminosity will continue. Numerous different liquids were tried with the same result. The experiment may be performed very easily and requires but an ordinary Ruhmkorff coil and a few small batteries. It is very important, however, that the spring of the vibrator is very thin and elastic, and that it vibrates like the wings of certain insects, like the dragon fly, for instance, rather than like the blows of a hammer. As this experiment requires only such apparatus as every physicist has, he suggests this as a simple way to show on a small scale some of the Tesla phenomena.

Glazing as a Science.

Glazing is being exploited as a science by Mr. Edward Atkinson, who, in a recent talk, told most interestingly of certain experiments he has conducted and experiences he has had in relation to the quantity, quality and usefulness of light as received through different sorts of glass.

At a meeting of the British Association, said Mr. Atkinson, an explanation was given of the Fresnel lens for transmitting light in one beam horizontally. Now, by reversion, a glass apparatus has been made to serve as a diffuser of light. You will be surprised to know that the amount of light that is absorbed by ribbed glass is ten per cent and by clear glass is eight per cent; that there is only two per cent difference in the obstruction of light between a double thick German clear and a fine ribbed plate of the same thickness.

Now, through plain glass you get no diffusion; your light falls directly on the floor, and the clear sunlight falls on your looms or frames, if you are at work in a factory, making dark shadows, while with the ribbed glasses you get a diffusion through the room without a glare. You need no window shades and you have no desk shadow. Then, in the practical use of light, you will get a vast deal more with that ribbed glass without window shades than you will with the clear glass with the window shades which you must have on a south side.

An inventor, continued Mr. Atkinson, worked on my theory of window glass. He has applied this idea to a conical glass, which is put under the arc light; with this he has done away with the glare and destroyed the shadow. You may have daylight from an arc light in your mills without the shadow and without the glare. The dispersion of light through the ribbed glass is relatively 64 per cent in horizontal planes to 0 per cent in plain glass.

SPONTANEOUS COMBUSTION OF ARSENIC.—Recently, powdered metallic arsenic which, in the process of powdering, had been moistened with water to prevent dusting, is recorded by E. Hirschsohn as capable of spontaneous combustion. A quantity of powdered arsenic in a double paper bag had been received late in the evening, and set aside over night in a basket containing other articles packed in straw and sawdust. The next morning, upon opening the store, the peculiar garlic-like odor attracted attention to the basket containing the powdered arsenic. An examination disclosed that the arsenic had agglutinated to a solid glowing mass; that the paper containers had been charred, and that a portion of the straw was scorched. A number of bottles in the basket had also burst, owing to the high heat, and upon the charred paper bag were sublimed some beautiful crystals of arsenious oxide. A fire, which probably would have been attributed to some other cause, was in this case averted.—Pharm. Ztschr. f. Russl., 1892, 612; Am. Jour. Pharm.

THE CONQUESTS OF MODERN SCIENCE. Surely I have established my thesis that dirt is only matter in a wrong place. Chemistry, like a thrifty housewife, economizes every scrap. The horseshoe nails dropped in the streets are carefully collected, and reappear as swords and guns. The main ingredient of the ink with which I now write was probably once the broken hoop of an old beer barrel. The chippings of the traveling tinker are mixed with the parings of horses' hoofs and the worst kinds of woolen rags, and these are worked up into an exquisite blue dye which graces the dress of courtly dames.

The dregs of port wine, carefully decanted by the toper, are taken in the morning as seidlitz powder to remove the effect of the debauch. The offal of the streets and the wastings of coal gas reappear carefully preserved in the lady's smelling bottle, or are used by her to flavor blanc-manges for her friends. All thrift of material is an imitation of the economy of nature, which allows no waste. Everything has its destined place in the process of the universe, in which there is not a blade of grass or even a microbe too much, if we possessed the knowledge to apply them to their fitting purposes.—North American Review.

Mechanical Progress.

Demand for Engineering Tests.

Dissatisfaction is expressed by engineers, by manufacturers of boilers, engines, motors and railway appliances and by fuel companies with the methods of making awards at the World's Fair, says *Iron Age*. It is understood that no sort of test is to be made of any engine, motor or fuel or mechanical device whatever. It is greatly to be deplored, these engineers say, that the exposition authorities have seen fit to neglect such an important matter. Here, they say, is an opportunity such as never before existed for the world to acquire a fund of information valuable beyond all computation to engineers and to manufacturers. Every type of engine, steam generator, gas and other motor; all methods for the transmission of power by compressed air, electricity, wire rope; all sorts of carrying machinery, and numberless other mechanical devices are here gathered together ready to have their comparative merits shown, and the opportunity is to be passed by. It is understood that no provision has been made for comprehensive scientific tests as suggested by the American Society of Mechanical Engineers. It is urged that not only practicing engineers but business men desiring to engage in some line of manufacturing could refer to the reports made and have an actual, unprejudiced account of the performance of any engine or machine in which they might be interested, instead of being forced to rely on the assertions of manufacturing agents.

This would not necessitate any competition, the engineers say. All tests of each class of exhibits could be made on the same line and the results published by the World's Fair authorities. They agree that even if Mr. Thatcher would carry out his single-judge idea and provide means of making tests it would be a big thing. It would be better for all concerned, they say, to have fewer judges and spend some of the money thus saved in making the tests.

As for the manufacturers who have exhibits at Jackson Park, they seem to have taken it so entirely as a matter of course that tests were to be made that most of them expressed great surprise when it was intimated to them that such was not the case. Had they known, many of them say, that no tests were to be made they would not have spent so much money in making exhibits. Some go still further and declare they would have made no exhibits at all. In brief, it would seem that all concerned are extremely anxious that tests be made.

In December, 1892, a committee appointed for the purpose by the American Society of Mechanical Engineers, at the request of the Committee on Awards of the World's Columbian Exposition, presented a report on methods for physical and mechanical tests of steam engines and other machines. After dwelling upon the great opportunities afforded by international expositions to keep pace with the developments of other nations in the various departments of science and art and for careful tests of the relative merits of the various products, manufactures, machines and methods developed under different conditions in various parts of the world, the committee recommended a most elaborate series of tests, going into great detail for the guidance of the National Commission. Although submitted in due form and in good season, it is said, this report was practically ignored by the Committee on Awards. Its suggestions have not been acted upon. Whatever merits the exhibits of engines, boilers and motors may possess will from present indications not be disclosed at the fair. All exhibits of this class will be there exclusively on appearances.

A NOVEL GRAIN DISCHARGER.—A novel and very interesting machine is now in use at the Millwall docks, London, for the discharge of cargoes of grain in bulk, the principle applied being the removal of the grain by the creation of a strong current of air. The machine is erected on a barge,

which is placed alongside the ship to be operated upon. To the machine is attached one end of each of six five-inch flexible pipes, the other end of which is carried into the hold or holds of the vessel and immersed a few inches in the grain. The engine is then started and the grain immediately flows at the rate of 100 tons an hour through the pipes into receivers, whence it falls by gravity into weighing machines, and then again by gravity into the craft sent by buyers to receive it. The machine in use has a power of 100 tons per hour, but the work done can be increased indefinitely by the addition of a corresponding engine power. The six pipes are worked together, but when necessary more or less of them can be shut off, and the rate of discharge is then reduced, but not in proportion to the number of pipes detached. With one pipe only in use this power exercised carries 38 tons an hour through it.—Transport.

The Production of Open-Hearth Steel.

The production of open-hearth steel ingots in the United States in 1892 was 669,889 gross tons, against 579,753 tons in 1891, and 513,232 tons in 1890. There was an increase of 90,136 tons, or over 15 per cent, in 1892 as compared with 1891. The production of 1892 was much the largest yet attained in this country. Our production of Bessemer steel ingots in 1892 was 4,168,435 gross tons, or more than six times as great as our production of open-hearth steel in the same year. Nevertheless our open-hearth steel industry has made steady progress in recent years.

Our statistics of the production of open-hearth steel in the United States include steel made in the open hearth by the basic process, which we have not undertaken to separately classify. Direct castings are counted as ingots.

The production of open-hearth steel in 1892 in New England, New York and New Jersey amounted to 38,131 gross tons; in Pennsylvania to 551,010 tons; in Ohio to 60,834 tons, and in the other Western, Pacific and Southern States to 19,914 tons.

The open-hearth steel made in 1892 was produced by 63 works, located in 12 States—New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Alabama, Ohio, Indiana, Illinois, Michigan, Missouri and California. The total number of completed open-hearth steel works in the United States at the close of 1892 was 80, or 9 more than at the close of 1891.

The quantity of open-hearth steel rails produced in 1892 was only 3819 gross tons, nearly all being made in California.

We have just received the statistics of the production of open-hearth steel in Great Britain in 1892, published by the British Iron Trade Association. The production in the year mentioned was 1,418,830 gross tons, against 1,514,538 tons in 1891, and 1,564,200 tons in 1890. The production of Bessemer steel in Great Britain in 1892 was 1,500,810 gross tons, against 1,642,005 tons in 1891, and 2,014,843 tons in 1890.

In the United States the Bessemer steel industry has received far more attention than the manufacture of open-hearth steel, while in Great Britain the production of open-hearth steel in recent years has encroached rapidly upon that of Bessemer steel. The production of Bessemer steel in Great Britain in 1892 was less than that of open-hearth steel in either of the years 1890 or 1891.—The Bulletin.

THE HYDEPHONE, A NEW APPARATUS FOR NAVAL WARFARE.—Experiments are, at the present moment, being carried on in France with an apparatus by means of which it is claimed that even in the densest fog the approach of a hostile vessel can be indicated to the distance of one mile. The apparatus, which has been called Hydophone, will prove very useful for the firing of a torpedo immersed at the entrance of a harbor. It consists of two parts. The first part is immersed under water at a depth of from 8 to 15 fathoms. The other part is on shore at a distance of about 5 miles from the point of immersion. The first part is an iron bell, weighing 170 kg.; its surface representing an exceedingly sensitive, isolated floating body. This sensitiveness is so great that the bell receives the vibrations caused by the revolutions of the screw of a vessel at one mile distance. These vibrations are electrically transmitted to the part placed on the shore, and there operate an alarm bell.

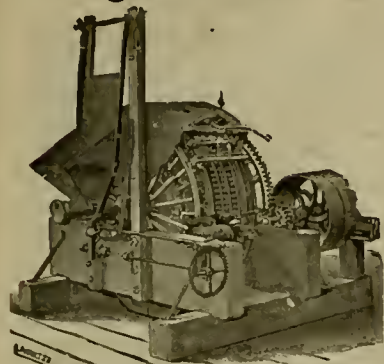
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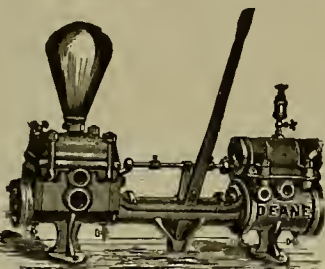
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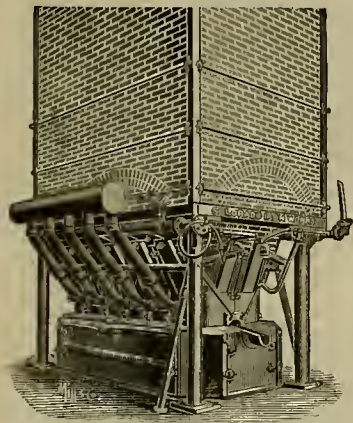
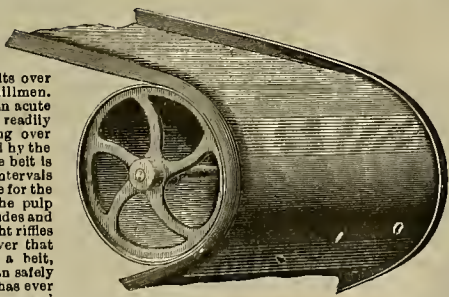
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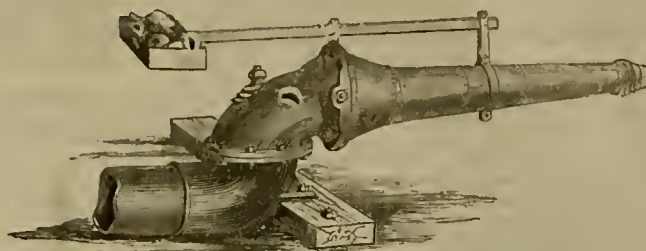
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Electricity.

Electrical Problems and Experiments.

Nikola Tesla, the eminent electrician, in a recent interview, said:

"The present methods of producing light are very wasteful. The electric light is a considerable advance over the gas burner, as far as efficiency is concerned; yet even the electric light, as at present produced, is very inefficient. Of the energy of coal we only get one-third per cent in light in an incandescent lamp; much more, however, in an arc lamp, because in that lamp we can reach much higher degrees of incandescence and because we have the advantage of an economical combination of carbon and oxygen."

"It is true that in recent years some notable improvements have been made in gas burners, and that, from a theoretical point of view, it is possible that a far more efficient burner than the ones at present in use may be produced."

"Probably the most important problem electricians are considering is the production of electricity by an efficient process from coal or other cheap substance; at least, most engineers have this subject in view. I think it is fully as important, and, in the end, perhaps even more important, to apply our skill in discovering how to transmit power from the waterfalls to any distance, for then we would be able to obtain energy without consuming any material, and our coal fields and forests would remain untouched, whereas the production of electricity from some material will involve the rapid consumption of that material."

"One of the problems which is of great importance, and the solution of which we are likely to witness in a few years, is the transmission of intelligence to any distance without connection. From present experimental evidence it can be quite safely concluded that an attempt to transmit intelligible sounds through the earth from here, for instance, to the European continent without any cable will succeed beyond a doubt. But it is a question whether such a method, which I have advocated for two years, would be available for all purposes, such, for instance, as the use to which the Commercial Cable is put."

"In that case it is questionable whether the scheme would be practicable. But one thing is certain, we will be able to transmit universal time all over the earth, and also be able to send in the same way very important short messages from centre to centre."

"Electricity is becoming more and more an important factor in our daily life, and more and more closely connected with our comfort. I think, after a considerable lapse of time, it will become practically necessary for our existence. For instance, there is the question of light. The advantages of the electric light are so great that even with the present wasteful methods we have been able to succeed in making practical use of it."

"But what will be our success when we shall be able to produce a hundred times as much light as we do at the present day? To do this is merely a question of time. Electric power is obtained by the use of dangerous, cumbersome and complicated appliances. But we have electric machines now which require no attention whatever, and which will in a few years supplant all other motors, simply because of their higher efficiency and ideal simplicity."

"Even now the cost is very great. Eventually we will be very likely to be able to heat our stoves, warm the water and do our cooking by electricity, and, in fact, to perform any services of this kind required for our domestic needs."

"It has been said that it will be impracticable to heat our houses by means of electricity on account of the great cost of coal; but, as I have said, we are now looking for other methods of getting electrical energy cheap. Even with the present methods, any rich man certainly prefers, instead of a stove in his room, to have it warmed by electricity. The method is expensive, but ideal."

"Electric energy can be applied to bicycles, carriages and all sorts of vehicles. It will certainly be applied to rowboats and will probably be so cheap that any man in ordinary circumstances can own a boat and propel it by this means. It would be a gloomy prospect, indeed, for the world if we did not think that this great power will be used to the advantage of the vast majority of the human race, and its benefits will not be confined merely to the wealthy."

"I am working on some other lines than those of which I have spoken, and if I succeed in my experiments they will be of great interest principally to scientific men. They

have also a practical bearing upon what newspapers sometimes call the 'burning questions of the age.' These experiments are quite apart from old notions and the lines which heretofore have taken up my attention. I cannot tell how soon I will complete these experiments."

"Most of my experiments heretofore have involved either rapidly alternating currents of high potential, or have reference to these electrical waves which are set up by alternating currents, and which, if very rapid, will not go through electric batteries at all, but will go through the best insulators. If they are less rapid, they will go through electrical conductors fairly well."

"Some years ago I demonstrated that a lampate filament could be made to glow from a current from a human hand. The light coming from the hand is produced by the agitation of the particles of molecules of the air. I charge my body with electricity, and from an apparatus which I have devised I can make the electricity vibrate at the rate of a million times a second. The molecules of the air are then violently agitated—so violently that they become luminous, and streams of light then came out from the hand."

"In the same manner I am able to take in the hand a bulb of glass filled with certain substances and make them spring into light. I make light come to an ordinary lamp in a similar way, simply by holding it in the hand."

"When I was in London I had the pleasure of performing one of these experiments privately before Lord Rayleigh. I shall never forget the eagerness and excitement with which that famous scientist saw the lamp light up. I can only say that the appreciation of such men amply repays me for the pains I take in working out such phenomena."

Loss Between the Coal and the Electric Light.

The following remarks were made by Mr. Stillwell at the recent electrical convention held at St. Louis, regarding the losses incurred in using electricity as a medium for light and power:

"I want to say a few words in regard to the saving being effected at an early or late step in the process of transforming the potential energy of coal into light or power for sale. It seems to me that we should bring out the fact that a great deal depends upon the relative strength of these steps. The central station man who is paying for energy in the form of coal and selling it in the form of light is losing various amounts at each step of the process, but up to the present time he is losing far more before it gets to the dynamo than he is after it leaves the dynamo. I have made a few figures to illustrate this: Suppose we have 1000-horse power potential in the coal which we are burning under our boilers. I think the best figures which steam engineers will claim for the proportion of that coal or energy which they will deliver in the form of mechanical power to the dynamos in a station that is continuously operating will be about ten per cent. Now, if we apply figures, obtained from records at the Kensington, Eng., station, we will find that under the variable load he loses about three per cent of that, and it is this amount of the energy, which is really a very large amount at that stage, which the scheme of Mr. Halpin (heat storage) proposes to economize. Of the seven per cent that at the Kensington station, we will assume, is delivered to the dynamos, I think it can be demonstrated that the dynamos, the distributing circuits, under a properly-arranged system, will deliver to the terminals or lamps about 8 per cent, or 5.6-10 per cent of the initial energy of our coal. We again suffer a relatively heavy loss because up to the present time our incandescent lamps give us but a small proportion of the energy they receive in the form of light. I estimate that out of the 1000-horse power that the central station man buys in the form of energy in coal, he may be able to sell 2.8-10 in the form of light. He has lost in the various steps about 930-horse power before he has reached the dynamo. In the electrical apparatus down to the lamp he loses."

THE old axiom that lightning does not strike the same place twice would seem to be falling into disrepute. On the farm of G. W. Exford, near Carthage, on the Antwerp road, stands, or rather stood, an elm tree which several years ago was twice struck by lightning and has since gradually died. During the storm of July 8th the old tree was again struck, breaking off the top and leveling the tree to the ground.—Ogdensburg Journal.

Useful Information.

How Wall Paper is Made.

The processes of color lithography and wall paper manufacture are in a great many ways identical, and are equally interesting. skilled artists are employed by the wall paper manufacturers to originate designs and novel effects, the latter-day cultivation of the public taste demanding the production of artistic and pleasing designs. A half-day spent in the inspection of a manufactory for wall paper is a profitable experience. One is apt to carry away spots of color deposited unawares upon one's garments, but that doesn't matter when one is on the scent of art and knowledge."

From the artist's room, where the designs are evolved, to the shipping department, where they are despatched, finished in compact bundles, upon their several journeys, the process of production is full of interest. The first stage is the designing in water colors by the artist of the pattern which is to be reproduced. Then, as in chromolithography, the pattern is traced and an estimate made of the number of colors that are used in the sketch. Say there are five, then five seasoned cedar rollers are prepared to receive the five portions of the sketch which contribute the five colors. The process by which these different portions of the sketch are placed upon the rollers is immensely curious. The designs stand from the surface of the rollers in high relief, and consist principally of thin hammered brass and felt."

Where solid blocks of color are required, that portion of the design is outlined with thin strips of brass which can be bent in any shape, these being pounded into the roller with a tiny hammer, and the spaces between the lines are filled in solid with strips of soft felt. When these surfaces are rolled with paint they print on the paper solid designs, which perhaps represent the petals of a flower or the green of a leaf, etc. The first prints of color in the sketch are the body colors. Next in order come the shadings, the embellishments, dots of gilding, etc., each of these being defined upon a separate roller. The work of outlining these designs is exceedingly difficult and laborious, the workmen following the portions of the design which are traced upon the rollers beforehand in order to be exact."

The work of outlining the designs on the rollers being completed, the first step is to print the background on the plain paper. The paper unwinds from large rolls weighing half a ton apiece, slowly passing under the moving machinery, up over rollers which carry it along to the brushes, which move rapidly back and forth across the paper as the latter passes along under them, and it emerges covered even with the required tint. This paint, by the way, is all mixed with water. Oil paint is not used at all; and the paint dries several shades lighter than it is in the liquid state. This fact has to be calculated upon in producing effects."

To go back to the paper which has just received its background; it passes from the brushes up over a bar, traveling away from the machine and stretching out in a long sweep to where a double endless chain, extending nearly 200 feet, the entire length of the building, traveling upon a sort of miniature elevated railway, moves perpetually around and around the little railway. In these chains are notches which run parallel to each other, and they catch up in their progress, as they pass the nearest point to the tinting machine, wooden rods which are placed in a rack close to the chains."

These rods catch the paper at regular lengths, bearing it up on to the little railway from which it hangs in long loops, and the procession of loops hanging from the rods, resting upon the notches in the endless chains, marches slowly down the long building, drying en route from the heat that emanates from a series of steam pipes which are laid along the floor under the railway. The heat grows more and more intense as the procession progresses, and by the time the journey is ended at the other end of the building all vestige of dampness has departed from the paper. The latter is rolled again as fast as it accumulates and deposited in compact bundles upon the floor, ready for the printing of the design."

The accomplishment of the latter process is done by means of a machine which prints several colors at once. This machine is circular in form, and has places for the adjustment of the cedar rollers, which contain upon their rounded surfaces the different portions of the design to be printed, which represent the different portions of the color in the design. Suppose, for instance, a single design of a spray of wild roses with

green leaves on a delicate blue background is to be printed. The background is washed on by means of the process described. To print the design say five rollers are used. first bears the primary pink of the roses and any other touches of pink that may occur in the design."

The next color is perhaps the shading of the pink, the darker portions of the petals, the next the green of the leaves, the next the yellow of the stamens of the flowers, and so on; the more intricate the pattern, the more colors it takes to print it, the more work to impress the pattern in its different portions upon the cedar rollers, and the more expensive it is to reproduce. Many of the patterns have finishing dots or lines of gold, which lend brilliancy to the effect. These are all defined in the same way on a separate roller."

After the paper has received the whole of the design, winding around the big wheel and passing under each cedar roller, receiving tints, shading and embellishment, it sweeps out over the bar as described before, being caught up in long loops by the sliding rods which move on the endless chains, and the long procession of loops moves in order slowly down the building. It is a queer sight. At the other end of the little railway the wooden rods drop off from the chain into a big box, and as they accumulate they are taken out and removed to the starting point, where they again set out of their slow journey across the building."

An automatic arrangement on the printing machine puts a little red mark on the paper at regular intervals of so many yards, I forget how many—the length of an ordinary roll of wall paper—and at the other end of the building is stationed a boy whose duty it is to roll the paper into the small rolls in which it is sold. As fast as the paper arrives from the drying journey, it is wound around a small rod and at each red dot a sort of knife cuts off the paper, the roll is adjusted again and the work of winding proceeds.—Boston Transcript.

How to Live a Century.

First, live as much as possible out of doors, never letting a day pass without spending at least three or four hours in the open air."

Second, keep all the powers of mind and body occupied in congenial work. The muscles should be developed and the mind kept active."

Third, avoid excesses of all kinds, whether of food, drink, or of whatever nature they may be. Be moderate in all things."

Fourth, never despair. Be cheerful at all times. Never give way to anger. Never let the trials of one day pass over to the next."

The period from fifty to seventy-five should not be passed in idleness or abandonment of all work. Here is where a great many men fall—they resign all care of interest in worldly affairs, and rest of body and mind begins. They throw up their business and retire to private life, which in too many cases proves to be a suicidal policy."

During the next period—the period from seventy-five to one hundred years, while the powers of life are at their lowest ebb—one cannot be too careful about catching cold. Bronchitis is a most prolific cause of death in the aged. During this last period rest should be in abundance."

Anybody who can follow these directions ought to live to be one hundred years old at least. There is always this comfort, however, if we cannot live up to our ideas all ways, we can at least try our best to do so, and the steady effort will be bringing us constantly nearer them.—Medical Age.

BICYCLES are machines by means of which muscular power can be used in locomotion to better advantage than in walking, and persons using their muscles in this way are, as the word velocipede expresses, swift-footed. Mechanicians estimate that six miles can be ridden on a bicycle with no greater expenditure of power than is required in walking one mile.

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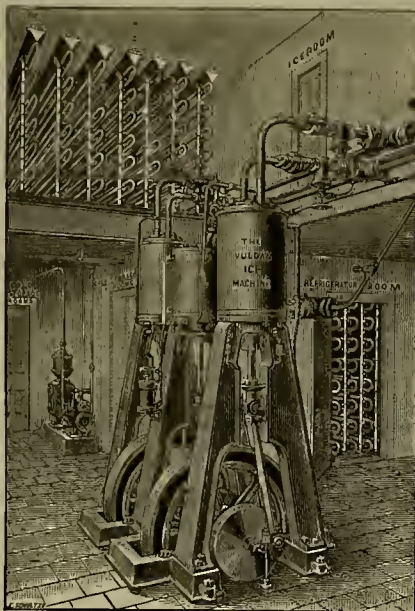
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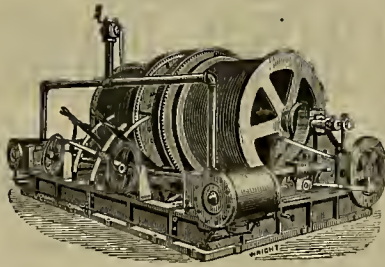
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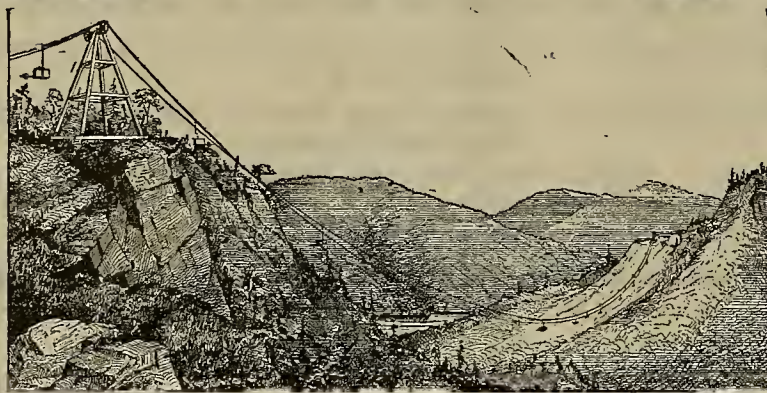
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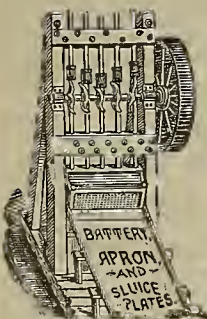
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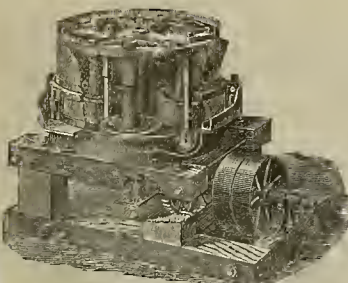
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AROUND PLYMOUTH.—*Amador Ledger*, June 3: Mr. Ray, president of the Consolidated Osceola Mining Co., is up looking after the interests of the company and is stopping at the Forest. President Ray has made some radical changes in the working of the mine and I think now the work of developing will be pushed with more energy. They think from measurements that they now have the tunnel within 40 feet of the ledge, and Mr. Ray expresses himself as sanguine that they will have it rich when they get to it. The Bay State has the water down now to the top of the level and, there being three of them, all 100 feet long, which makes a vast body of water, the work of lowering the water is correspondingly slower than whilst confined to the shaft. However, the machinery is all working good and the management confidently expects that the water will soon begin to drain from the country ground and gradually lessen until the bottom is reached, when it will be no bother to handle the water. Experience has taught that these subterranean reservoirs will eventually drain themselves when they have capacity to dump their water. The Baldwin mine is fast getting the machinery in shape and in a short time expects to fire up. I understand workmen and mechanics have been engaged for work on the machinery for the New London plant and that work on the same will be commenced very soon. The prospects in the Pioneer, I understand, grow more flattering as they get farther along on the lead. Several parties have been looking at Mr. Vaughn's fine prospect on the extension of the Caucasian and it would not astonish me to hear of a sale any day, for any person wishing to invest in this kind of property not being satisfied with this prospect had better quit hunting for rich mines. The Osceola people left instructions to their foreman to commence work on the extension which they located north of the original mine; the croppings on this extension look well; a good many miners think it a good location and predict, when properly developed, a rich mine.

Butte.

FORBESTOWN.—*Cor. Grass Valley Telegraph*, June 3: The industry which furnishes the 500 inhabitants of this place employment is gold mining. Forbestown is one of the oldest mining towns in California. In its early days its rich gravel deposits were known the world over, but at the present time gravel mining is on the wane and much industry is being plied to develop the large quartz ledges which abound throughout the county, and many years ago were not thought of while in the process of extracting the precious metal from the gravel. But modern ideas, together with cheaper facilities and improved machinery, have wrought a change, and to-day the vast quartz ledges, although of low grade, are worked to a handsome profit. At present only two quartz mines are in active operation in this place—the Gold Bank, under the able management of Harry P. Stow, and the Shakespere, superintended by Mr. G. Price of Calaveras county. The Gold Bank mine, although only worked to the depth of 350 feet, is a magnificent property, ably managed, and contains all of the modern improvements and appliances in mining. The mill is of 40 stamps and was erected by Mr. Geo. Nihell of Nevada City. The mine and mill employ about 125 men, and a reduction works, employing 77 men, is also run in connection with the mine. Henry P. Stevens has erected a new residence, complete in all its appointments and will compare favorably with any mansion in northern California. The Shakespere mine employs about 50 men and runs a 10-stamp mill, but is building an additional 20 stamps to the works. The mine is also worked to about the depth of 350 feet. Mining experts are here looking into affairs and in all probability some mining enterprise may be inaugurated. A large sawmill is being built, and at the present outlook Forbestown has a bright future and is destined to be a town of considerable importance.

Napa.

QUICKSILVER STRIKE.—*Middletown Independent*, June 3: The quicksilver mining claim belonging to Howard Fraser, G. A. Sacy, J. B. Jamison and S. E. Shore, located in Oat Hill mining district, Napa county, has reached a stage of development that makes it more than a mere prospect. The owners have done considerable work. A tunnel has been run into the ore body a distance of 100 feet, 70 feet being in rich ore. At the back end of the tunnel a crosscut has been started and is now in eight feet, showing the same character of ore that was found in the tunnel. It is the intention of the company to run crosscuts in opposite directions to the tunnel to develop the extent of the ore body. Eighty feet below the 100-foot tunnel another tunnel has been started. If as good ore is found in this tunnel as exists in the tunnel above, it will show that the property is of great value. A road has recently been constructed to the mine and is connected with the new Oat Hill and Calistoga road. At present the company is constructing a foundation for retorts, which will shortly be placed in position. When this is accomplished it is believed the mine will be in a paying condition. The situation of the property is such as gives it decided advantages for cheap working, there being plenty of water and wood, with the necessary site for furnaces. Assays made from unselected ore showed 30 per cent in quicksilver. This property makes the best showing,

for the work done, of any discovery that has been made in recent years, and it is predicted that it will take its place among the large quicksilver-producing mines of the State within a short time.

Humboldt.

MR. HARPE'S COAL MINE.—*Blue Lake Advocate*, June 3: Mr. George Harpe passed through town Tuesday en route to his ranch on Mad river. Not all Mr. Harpe's Mad river really was comprehended in the Goodman prairie farm recently disposed of to Mr. Wheeler. He has land left, and, from indications, a large vein of coal on it. He has prospected his coal find very little as yet, but he proposes this season to dive down into the bowels of the earth sufficiently to discover the extent of the coal whose outcroppings have attracted so much attention. All the specimens look and burn like first-class coal.

Nevada.

TAKING OUT GRAVEL.—*Transcript*, June 1: An immense block of gravel has been cut out at the Odlin drift mine and will be hoisted to the surface and washed in a few days. The gravel is mixed as to quality, some of it prospecting very rich and some of it being only ordinary. It is expected that plenty of rich gravel will be found in the Odlin before long. Ten more men will be given employment next week.

VERY RICH ORE.—*Grass Valley Telegraph*, June 3: There was quite a ripple of excitement in town last night when it was learned that very rich ore was coming out of the South Idaho mine. A fine ledge exists in the shaft at the depth of 65 feet, and the stringers on each side that lead to the ledge are filled with as bright gold as you would care to see. A harley sack full of the ore was brought to town last evening, and hundreds of people viewed the ore. The owners of the South Idaho have been tenacious in their efforts and now it is evident that they will reap a rich reward for their long and faithful work. Almost the entire stock of the mine is owned in Grass Valley.

A PAORPAROUS DISTRICT.—*Grass Valley Union*, June 6: At no time have the mining prospects in Grass Valley district been better than they are at present. From all sides come reports of rich strikes, and the specimens daily shown on our streets would draw assessments from the pockets of the least enthusiastic stockholders. It is gratifying to know that in many cases fortune has smiled on comparatively poor men and that the hard work and patient waiting of years have been at length rewarded. These discoveries are ample and conclusive proof of what every resident here knows—that so far as mining is concerned the work of this district has been hardly begun and that here the placing of capital will amply and richly reward all who seek a safe and sure investment.

REWARD HOISTING WORKS.—*Nevada Transcript*, June 5: The foundation is about laid for the hoisting works building at the Reward mine, near the Rifle grounds. It is to be a large and thoroughly substantial structure and will contain heavy material capable of sinking to a great depth. The Miners' Foundry has the contract to erect the works and will push the same to completion as rapidly as possible. C. C. Weisenburger has charge of the carpenter work and is doing a good job.

WHAT IT WAS WORTH.—The gold bar from the Federal Loan mine, which Superintendent Vincent was about to bring to town the other day, but concluded not to and thus escaped having it stolen by the highwaymen who subsequently stopped him, was worth \$2700. Had the road agents secured the bar, they would doubtless have taken a trip to the World's Fair at Chicago.

TO BOND A MINE.—*Grass Valley Union*, June 2: W. W. Chamberlain was up from Smartsville yesterday on some mining business. He is trying to get a company to bond the old Forlorn Hope quartz mine at that place. The mine is owned by San Francisco parties and they want to get a company to bond the property and develop it. The mine has turned out a great deal of good rock in days gone by and is no doubt a good piece of property. Mr. Chamberlain left last evening for his home, but will be here again at an early date.

WASHINGTON MINING NOTES.—*Transcript*, June 2: Considerable mining is going on in the Washington district. At the Eagle Bird everything is running full blast, 45 or 50 men being employed. A gentleman from Oakland named Berriman has been sinking a shaft on the Lindsey Hill mine and met with encouraging prospects. There is talk of the Yuba Company bonding or buying the Lindsey mine, which is not far from the Yuba. The old Hathaway mine is being prospected and some very rich quartz has been taken out. The ledge is large, but as yet the pay streak is small. Work goes ahead at the Spanish mine without interruption. There is little change in this mine from one year's end to another. Parties are expected up from San Francisco in a week or so to start work on the Cole & Williamson mine, on Washington creek. The German mine has been closed down for some time and the owners are undecided as to what they will do with the property.

Shasta.

PROMISING LOCATIONS.—*Shasta Courier*, June 3: Wm. Harvey, of Flat Creek, owns a couple of promising locations in that camp. On one location he has run a tunnel in 140 feet, and finds the vein from 5 to 7 feet wide. He is at present working on another ledge which is about 14 inches wide and produces some very rich ore, but the rock is so hard that little progress is made. He has a young arrastre and can crush 100 pounds daily from this ledge, with very satisfactory results. The reported strike on Muletown mountain, mentioned last

week, was made on a claim located and owned by George Abernathy and Wm. Chynaweth. Abernathy discovered a prospect on the place some time ago and later a small pocket was taken out by George and Ed Boswell, who were working on it. Abernathy and Chynaweth are sanguine of the mine panning out very rich, as the pocket was taken from the middle of the ledge. It is located between Olney creek and O'Neal gulch, near Kellner's, and is the largest ledge in that section, being 30 feet wide. It has been located many times, but no great amount of actual work or development has been made on the property. Jim Loag, we believe, in early days did take out and work some of the quartz, which returned \$8 per ton, a good showing considering the primitive methods of milling quartz in those days. Work has been actively pushed for the past two or three weeks on W. P. Miller's mill, just below Middle creek. A good force of men are employed, and the mill will be entirely refitted with new machinery. The old works will be taken out and a 10-stamp battery and a bigger boiler will be put in. Miller intends to run the mill on rock from the Hartman and neighboring mines, and will also do custom work. He intends to use a new electric-cyanide process which, it is claimed, will successfully work the baser ores of this locality. The management of the Clark, or old Harrison mine, at Quartz Hill, intends to increase the battery in a short time. They are getting away with about 25 tons daily, and the mine is said to be turning out bullion in a way that greatly pleases everybody interested in it.

CALUMET.—*Redding Free Press*, June 3: Samuel Sandry, foreman of the Calumet mine, was in Redding yesterday. He informs us that he has sunk a two-compartment shaft down 55 feet, and has run a crosscut some 80 feet to tap two ledges. So far nothing special has developed, but he expects soon to run across good quartz.

Siskiyou.

THE MINING INTERESTS.—*Yreka Journal*, June 3: Siskiyou county is great in extent and great diversity of resources. The mining interests of the county are attracting the attention of mining men and other capitalists. The buried wealth of old Siskiyou is beginning to be appreciated. Millions of gold have been taken from our mines since the "days of '49." The gold heretofore has been gathered from the surface, and far and wide the golden checks have been gathered in. That which lay near the surface yielded readily to the pioneer miner. The gulches and channels have given up the precious metal to those who sought for it, but the ledges that supplied the gold that has heretofore been gathered up are still imbedded in our lofty hills and mountains, and await the active prospector who will discover the source of the treasure. Gold is found in the high mountains and far beneath the surface in the lowest valleys. Our river-beds are strewn with gold, and whenever the channel has been diverted from its course, the shining metal has been found. No mines have ever been worked extensively in this county. That is, no bonanzas have been developed, but the numerous small mines that have been and are being worked demonstrate conclusively that our mining interests are still unknown, and the prospects are of the most flattering kind. The mines of the county include placer and quartz. While the placer mines have been the principal source of our gold yield heretofore, the quartz ledges are now looked to as the permanent supply, and wherein the interest is centered. There are a number of mining districts in the county, and each embraces a distinct area of country. We shall endeavor to speak of each so far as we have been able to gather reliable information.

HUMBURG DISTRICT.—This district is on the south side of the Klamath river, 15 or 20 miles west of Yreka, and includes the region drained by Humburg creek and its tributaries. So far, no extensive ledges have been developed, but there are numerous small mines that show the most encouraging prospects, and are being opened as fast as means and labor will permit. There are four mills in this district that are crushing a quantity of quartz. We will here speak of a few of the claims. The Hunt mine on the middle fork of Humburg is down 140 feet, and has a fine, well-defined ledge in the bottom. They are working a number of men, and the mill is kept going night and day. The Hegler Bros., on the North Fork, have struck the ledge in their lower tunnel. The quartz ledge is three to four feet wide, and is richer than in any other part of the mine. They are running the mill to its full capacity. Phillips & Cartright have a splendid claim. They have gone down on the ledge 300 feet and have just made a crushing of 25 tons, which yielded \$48 per ton. These parties have been much bothered with water, but now have it drained and will push the work. They have a good supply of timber on hand, and will now take out a large quantity of quartz. Humphrey & Jesserman have a well-developed ledge three to four feet wide and of a high grade. This is a promising property, and, with a little more development, which will shortly be done, will attract attention. The Galloo mine, owned by Clark and Wheeler, is showing a fine prospect. Jasper & Co. have over 400 feet of tunnel, and the claim shows a well-defined ledge. There are numerous other claims in Humburg district, but this will suffice to show what is being done. The miners all wear a smile, which indicates that they are satisfied. A number of capitalists and mining men from the lower country are investigating these properties, and ere long we may see extensive operations in this region. The formations in this region are generally granite, porphyry and slate. The gold-bearing quartz is found in the slate. There is some placer mining in this section. Morrison & Lash have a good claim of this character which is yielding nicely.

COTTONWOOD DISTRICT.—This district, on the north side of the Klamath, near the railroad, contains some fine mines, quartz and hydraulic. There is a quartz mine in the district, near the Oregon line, known as the Spencer, which is yielding a large dividend. The owners have a steam stamp-mill in operation, which runs through about eight tons a day, making a profit of over \$100 each day. Gilson & Co., near the Klamath, are working the Blue Gravel on a large scale. This is probably one of the most extensive hydraulic claims in the district. Large operations are projected and in working order in the Klamath river. Claims are numerous throughout this district and the adjoining district of Hungry creek.

SALMON RIVER DISTRICT.—Far in the southwest of the county, beyond the Salmon mountains, is a great mining region, known as the Salmon River district. Owing to the lack of roads to this region there has not been as much development to the mines as otherwise would have been. A road will be completed to this section this summer, which will create a boom and open up the country. There are now some excellent properties giving fine returns. As an illustration of the mines of this country we note one particular claim. Charles Nicolet called at the office and spoke of his own interests. He has a quartz ledge that varies from one to three feet in width, and the average yield per ton is \$37. He grinds the ore with an arrastre which is run by water-power, eight months in the year, and grinds three tons per day. The ore is easily taken from the ledge, and at this rate it yields a very handsome profit. As before stated, the want of roads has prevented the bringing in of proper machinery, and has necessitated working the mines in a primitive manner.

QUARTZ VALLEY DISTRICT.—This district lies southwest of Scott valley, and, like all of our mining districts, includes quartz and hydraulic mines. The Allen quartz mine has a good mill and other machinery on it, and has been worked for a couple of years. A. G. Myres is now erecting a mill on a claim in that vicinity, and has a quantity of high-grade ore in sight. The Campbell placer mine, in this vicinity, is now being worked successfully on a large scale by an English company, and from what we can learn, it will pay a royal dividend. This district has a high hope for the future.

DEADWOOD DISTRICT.—Some excellent mines are in operation in this district, which includes the region beyond the Greenhorn mountains, 12 or 15 miles southwest of Yreka. H. Schroder has an extensive mine with mill and complete works, and is doing a large business. Several other quartz and placer mines are yielding their treasure in the surrounding country.

YREKA DISTRICT.—A large area in the vicinity of Yreka has from the earliest days of mining in California yielded a large amount of gold. Placer mining has been the principal interest in this district, but there are certainly some good quartz ledges in the adjoining mountains, which supplied the auriferous gravel. Less than two miles south of Yreka is the Greenhorn Blue Gravel mine on the land of A. Lee. The claim is operated by Raynes & Austin. Enough work has been done to justify them in making extensive improvements. The gravel is 100 feet below the surface, and requires considerable machinery in the way of pumps, hoisting works, etc., to operate it. They have been idle for the last week, waiting for a new pump, but we understand a large force of men will be put to work immediately and push the work vigorously. It is generally conceded that this is one of the finest properties in the country. Several quartz ledges are under development in this vicinity that show good prospects.

SCOTT RIVER DISTRICT.—Forty miles west of the county seat is the old and well-known Scott River mining district. A large quantity of gold has been taken from the gravel along and adjoining Scott river. It has been worked since the early days. The Scott River Hydraulic Mining Co. has a large amount of money invested in the way of ditches, pipe, etc., and will no doubt take out plenty of gold. There are other companies in the vicinity operating extensive claims. As in all the districts, there are many smaller claims near that are doing well, and for want of space and data we cannot mention the particulars. Farther down the Klamath river are Sciad and Happy Camp districts, where are many good hydraulic and placer mines that are yielding good returns. A number of excellent claims are also successfully operated on Indian creek, which is 10 or 12 miles to the west of Yreka.

Trinity.

SALE CONSUMMATED.—*Trinity Journal*, June 3: The sale of the Ward mine was consummated last Saturday and the new company, under the name of The LaGrange Hydraulic Mining Co., has begun the survey of the ditch from the mine to Rush creek. It will be nearly two months before the survey will be completed and a call for men made. Mr. Beaudry says he proposes to have lines enough surveyed to be able to select the most practicable one possible. A great deal of the work will probably be done by contract.

GOON CLEAN-UP.—Another good clean-up was made at the Hubbard mine last Wednesday. This property is paying well, and as the company has a large territory it will be a good property for many years to come.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Enterprise*, June 3: 1500 level—The drift started west from the end of the southwest drift, 75 feet above the sill floor, has been extended during the week 62 feet; total length 77 feet; continuing in a quartz formation which assays from \$2 to \$4 per ton. 1650 level—Have continued

making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working west from the old stopes, on the third floor, operating through the upraise, No. 6, carried up from the main northwest drift; also from the old stopes in working north from this crosscut run west from the northwest drift. The south drift started at the end of the crosscut run east from a point 60 feet up in the upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 13 feet; total length, 131 feet. From the end of this south drift an east crosscut has been advanced 23 feet in porphyry and quartz showing some value. Have continued to extract some ore of average quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Have extracted during the week from all parts of the mine 187 cars of ore about 185 tons, the average assay value of which per car sample was \$32.23 per ton.

OPHR.—1565 level.—The west crosscut started from the bottom of the winze, sunk 52 feet below the sill floor of this level, has been advanced 19 feet; total length, 141 feet; in a porphyry, clay and quartz formation of low assay value. Late Thursday night, at a point 90 feet from the winze, a strong flow of water broke through the sides and top of this crosscut, causing a suspension of work in the face of the crosscut. We have a donkey pump at work throwing the water up to the 1465 level. Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican Company.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from the east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 23 feet; total length, 232 feet, continuing in porphyry formation carrying clay separations and fine lines of quartz. Have continued the work of making the necessary repairs in the shaft, being joint work with the Ophir Company.

UTAH.—340 level.—West crosscut No. 3 from the north drift, from west crosscut No. 2, at a point 195 feet from its mouth, has been extended 15 feet; total length, 196 feet; continuing in porphyry, quartzite and clay formation with a strong flow of water running from the face.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 10 feet, making the total length 370 feet; the face is in porphyry and streaks of quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 18 feet, making the total distance west of the joint shaft 3228 feet; the face is in hard porphyry and small streaks of clay and quartz.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced the past week 18 feet, making the total distance west of the shaft 3228 feet; the face is in hard porphyry and small streaks of clay and quartz.

ANDES.—On 420 level, have finished stripping north drift from east crosscut No. 3 to the face of north drift. Have been easing timbers in main north drift at east crosscut No. 1.

GOULD & CURRY.—200 level.—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 5 feet; total length, 493 feet; face in porphyry. Also did considerable repairing during the week. **Sutro tunnel level.**—We have been cutting out ground and timbering same for a ewich. Owing to repairs being made to the Hale & Norcross incline, the men employed on this level have been unable to go to work during the last few days. During the coming week, when these repairs are finished, work will be resumed in the east crosscut, which was run from the main north drift near the south line.

BEST & BELCHER.—200 level.—West crosscut No. 2, started in northwest drift, 230 feet from our south line, has been advanced 14 feet, passing through porphyry and quartz; total length, 130 feet. 900 level.—West crosscut No. 4, started in southwest drift 112 feet from west crosscut No. 3, has been extended 18 feet through hard porphyry, and work in the same discontinued; total length, 91 feet. Also did some repairing during the past week. **Sutro tunnel level.**—We have been cutting out ground and timbering the same for a switch. Owing to repairs being made to the Hale & Norcross incline, the men employed on this level have been unable to go to work during the last few days. During the coming week, when these repairs are finished, work will be resumed in the joint east crosscut, which was run from the main north drift near the Gould & Curry south line.

HALE & NORCROSS.—1800 level.—Have done but little work the past week on account of retimbering the main shaft at head of incline, which prevented the use of the incline and necessitated the stoppage of operations on the 1800 level pending the completion of this work. Will resume work on this level on Monday morning next. Main shaft.—Are retimbering at a point where main incline connects with the shaft.

POTOSI.—Have started a drift south 35 feet west of the main shaft on the 850 level, which is now out 24 feet; face is in porphyry and streaks of quartz which give low assays. The south raise, 80 feet south of Potosi winze, 930 level, is connected with the south end of the stope above. The south drift, 200 feet east of Potosi winze, 930 level, is out 17 feet; face shows four feet of ore that gives fair assays. The north drift, opposite the last named drift, is out 102 feet; face shows five feet of fair-grade ore. Near the face of this drift have started an upraise, which is up 12 feet on the slope; the top shows 3½ feet of good ore. The south stope

above the 1000 level is up 52 feet, and yielding fair-grade ore. The north raise, above the 1000 level is up 121 feet on the slope; top is in fair-grade ore. The west crosscut, 1000 level, 120 feet south of top of raise from the 1100 level, is out 65 feet; face is in porphyry. Extracted and sent to Nevada mill the past week 552 tons and 250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 582 tons. On hand at mill 90 tons and 1500 pounds. Average battery assays, \$22.23; average car sample assays, \$25.50. Shipped to the U. S. Mint, Carson, 403 pounds crude bullion.

CHOLLAR.—We are yet engaged in making repairs to the north drift, 850 level. The east crosscut near the south line, 930 level, is out 267 feet; face is in porphyry.

WARD SHAFT.—This repairs to the two hoisting compartments of the shaft are completed, and are now lining up the pump shaft.

BULLION.—The repairs to the two hoisting compartments of the Ward shaft are completed, and are now lining up the pump shaft.

EXCHERQUE.—The repairs to the two hoisting compartments of the Ward shaft are completed, and are now lining up the pump shaft.

ALPHA.—The repairs to the two hoisting compartments of the Ward shaft are completed, and are now lining up the pump shaft.

OCCIDENTAL.—The main south drift, 650 level, continues in ore of fair grade. We have started an upraise from this drift at a point 310 feet south of No. 1 winze. The top is in ore assaying \$23 per ton. No. 6 crosscut from north drift, 750 level, is in 56 feet, and has reached the east wall. No. 7 crosscut on the same level is in 21 feet; face is in quartz and porphyry. No. 3 crosscut from Zedig drift, Sutro tunnel level, has been extended 15 feet; face in quartz and porphyry.

KENTUCK.—We continue to extract from two to three tons of ore per day from the 160 level of the average value of \$30 per ton. On the 1100 level we are extending the south drift in fair-grade ore, and have opened the third floor above the track, making the upraise 21 feet. The joint east crosscut near the north line is in 30 feet; face in quartz and porphyry. Have commenced shipping ore to the Santiago mill.

CON. NEW YORK.—The south drift from the bottom of the winze below the 650 level is in a distance of 68 feet; the face is in fair-grade quartz. No work has been done in the west crosscut from the southwest drift, 800 level, during the past week, on account of repairing.

SILVER HILL.—No work has been done in the mine during the past week.

Pioche District.

THE YUBA MINE.—Pioche Record, June 1: Shipments of ore from this mine of the Pioche Con. Co. to Salt Lake continue regularly, and, besides several cars unreported, about 30 tons of first-grade ore lies in the bins. This ore sells in open market for about \$110 a ton and is of a very desirable character. The recent development in the 1225 level of the mine, east, has opened up so well during the past week that the mine may now be said to look better than at any time in the past, and shipping ore for a long time to come at the present rate is uncovered. The ore is principally steel galena and heavy carbonate. The best showing is in the ledge opened three weeks ago in the ten-foot north crosscut from the 1225 level and about 400 feet east of the shaft, where two faces of ore are exposed—one five and the other four feet in width, each assaying from 96 to 222 ounces silver to the ton and from 40 to 60 per cent lead. The drift on the thirteenth level run west to connect with the old Mazepashaft has reached a distance of 932 feet, and yesterday sinking was begun to connect with levels of the Mazepa mine. When this connection is made, an abundance of good air can be secured which is what is badly needed in the Yuba.

Island Mountain District.

PLACER MINES.—Elko Independent, June 3: Island Mountain mining district is situated in the northern part of this county, 75 miles north of Elko. This camp is strictly a gold country, and gives, under the present management, promise of being a great producer of the yellow metal. These mines were sold last December to a wealthy Colorado syndicate, now known as the "Island Mountain Mining, Milling, Land and Investment Company." It owns a number of placer claims and quartz ledges. Its purpose is to improve this property by establishing an entirely new water system. This will require 12 miles or more of ditch and the building of several reservoirs, which will be extensive, covering several thousand acres of ground, thereby storing all the flood waters, and enabling them to utilize thousands of inches of water that now cannot be handled. The reservoirs will supply about 4000 miner's inches daily during the entire season, and the ditch will give 400 feet pressure. The value of the placers is uniform and pays from grass roots to bedrock. The gravel averages about 9 feet; the gold is coarse and is worth \$19.45 per ounce. Judging from the character of the gold, these placers have evidently been fed from the quartz ledges. Nuggets upon bedrock are not uncommon. The company is now working night and day, running two giant and one ground sluice, thereby using every inch of water the present ditch will supply. There are employed about 20 white men who are moving large quantities of gravel and meet with very profitable results. The improvements will be commenced in July and completed before the snow falls, and he ready to husband all the water possible next spring.

Kennedy District.

RICH ORE FOR SHIPMENT.—Silver State, June 3: A. Fiege, one of the owners of the Gold Note

mine, is here with 15 tons of ore from that mine which is to be shipped to the Portland Smelting Works. The ore is very rich, samples which were made showing that it will work nearly \$200 per ton. Mr. Fiege says it is probable that a mill will be built in the district very soon. Mine-owners are not very anxious to ship ore on account of the heavy expens of transportation and reduction. A mill would make Kennedy one of the best gold camps on the coast.

Central District.

ANOTHER STRIKE.—Silver State, June 3: R. E. Staudinger, one of the former partners of the Blackbird mine, which was recently sold to Eastern parties, has made another rich strike of a gold-bearing ledge near the Blackbird. It is said to be very rich.

A GOLD MINE.—The Blackbird mine is turning out \$400 or \$500 a day of gold bullion.

DAKOTA.

THE COLD, HARD FACTS.—Deadwood Pioneer, June 2: Private advices from Rapid City would seem to indicate beyond a reasonable doubt, notwithstanding the positive assurances of General Manager Thorburn to the contrary, that the status of affairs at the chlorination works of the Black Hills Milling and Smelting Company, located in that city, is anything but satisfactory to either the owners or creditors. Without assuming at this time to either criticize or commend the merits of the plant as an institution for the recovery of mineral, we give the situation as gleaned from a very reliable source. The plant is idle and will probably not resume operations under its present management. The institution owes to its employees about \$10,000, and the men will not return to work until they are paid 40 per cent of this amount and assurance given that the balance will be forthcoming in a reasonable length of time. The men do not care particularly who manages the plant, so long as they are sure of their pay; but aside from these are other heavy creditors, sufficient to more than double the liability. These creditors, which include the Elkhorn railway, First National Bank, of Rapid, and several prominent business men of that city, have held a conference and are willing that the plant shall resume operations under new and experienced management, but insist that Mr. Thorburn is not the man to make it a success and unless he resigns they will press their claims to execution. These are the cold facts, given to us on what we have every reason to believe is reliable authority.

UTAH.

LEACHING WORKS.—Park Record, June 3: W. I. Salkeld, the famous millwright who constructs all the Ontario Company's mills and hoisting plants, arrived in the Park this week and on Wednesday, with the assistance of Snrveyor C. P. Brooks of Salt Lake, staked off the sight upon which the proposed new leaching plant for the Ontario Company will be constructed. The Record man interviewed Mr. Salkeld in relation to the proposed plant, but was informed that he knew absolutely nothing about the matter—didn't even know whether it would be built or not, and had no positive information to give out. All the same, the indications point strongly to the fact that the new plant will be constructed and that work will be commenced in the near future. A large bill of lumber has been ordered and is arriving daily, and several four-horse teams are kept busy hauling it to the site, where it is being unloaded and piled up. According to the stakes recently placed the structure will be 270 feet long by 80 feet wide, and the way lumber is arriving would indicate that the structure is to be quite that large in dimensions. Nothing definite as to size and construction may be known to-day, but the Record predicts that there will be within the next two weeks, if not before. In the meantime, it is quite encouraging to observe the present active signs favoring the construction of the new plant.

IT IS NOW FINISHED.—The Park City Sampling mill has been completed and is now in perfect working order. The main plant was completed and all the machinery given a thorough trial some days ago and found to be in first-class order. The plant could not be finished, however, until this week, owing to the fact that the elevators did not arrive when expected. They are now in place, have been tested, and the mills may be said to be one of the most complete and convenient plants in the West, and a credit to both Mr. Mackintosh and its builders, Messrs. Pape & Campbell. The structure is quite a large one, and contains the following compartments: Ore sheds, 40x150 feet; machinery room, 30x43; sampling room, 16x33; plate room, 16x16; machinery cellar, 20x24 and 16 feet in depth; and an engine and boiler room 28x33 feet, the latter being of brick with steel ceiling. The entire structure is really fireproof, as the roof and sides are covered with No. 24 steel roofing and siding, while the bin and wheeling floors are of heavy boiler iron. The dumping floor for teams is elevated, and is reached by a grade of 1.75 inches to the foot, and no trouble is experienced in drawing the heaviest loads up the incline. Bins have been set aside for all the regular shipping properties in the district, and the name of each mine is painted on the bin, which are numbered for various lots, so that no mistakes can be made. This floor is quite roomy, and will accommodate 16 four-horse teams at one time. The foundations for all the heavy machinery are in keeping with the balance of the plant and were put in to stay, and the vibrations experienced in the old mill are conspicuous by their absence. Throughout, the plant is perfect, and Mr. Mackintosh expresses himself as highly pleased with the substantial work performed by the contractors, Messrs. Pape & Campbell, who carried out the plans and ideas of the structure to the letter. The mill is capable of handling much more ore than the district now produces.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 30, 1893.

- 498,810.—CASKET HANDLE.—L. H. Bannister, Pasadena, Cal.
498,378.—GYMNASTIC APPARATUS.—T. Bessing, Los Angeles, Cal.
498,380.—HEATING APPLIANCE.—F. E. Browne, Los Angeles, Cal.
498,741.—GANO PLOW.—J. S. Butler, Tehama, Cal.
498,628.—SAW HANDLE.—M. M. Cope, Noyo, Cal.
498,245.—HAMMOCK.—C. A. DeLaney, Santa Barbara, Cal.
498,636.—EDUCATIONAL CABINET.—C. L. Ellis, S. F.
498,638.—TOOL FOR TURNING PIPES.—G. Englund, Seattle, Wash.
498,543.—GAS GOVERNOR.—A. Ford, Golden Gate, Cal.
498,714.—WATER-WHEEL REGULATOR.—C. Hagmair, S. F.
498,550.—ENCLOSURE STARTER.—Heintzelman & Noyes, Sacramento, Cal.
498,659.—SEWER CLEANING BRUSH.—S. E. Johnston, Selma, Cal.
498,363.—CHECK-RAIN DETACHER.—H. P. Kyes, Riverside, Cal.
498,355.—TROLLEY CATCHER.—C. A. Lord, S. F.
498,663.—SCENIC APPARATUS.—W. H. Lytle, Portland, Or.
498,669.—SCENIC APPARATUS.—W. H. Lytle, Portland, Or.
498,441.—TUBULAR BOILER.—E. L. Martin, Tulare, Cal.
498,688.—FURNACE WATER-BACK.—C. Nye, Newmar, Cal.
498,657.—ROAO CART.—G. J. Overhiser, San Diego, Cal.
498,726.—STRAPE GAO.—SPOOR.—C. W. Preston, S. F.
498,696.—SPRAYER.—A. G. Provin, Puyallup, Wash.
498,447.—CARBURATOR.—R. J. Rolison, S. F.
498,575.—CAR COUPLING.—F. M. Ryan, S. F.
498,449.—VENTILATOR.—C. H. A. Smith, Los Angeles, Cal.
498,318.—EXTENSION TABLE.—W. C. Steers, S. F.
498,400.—GAS GENERATOR, ETC.—T. A. Stombs, Los Angeles, Cal.
498,326.—CARB GRIPPER.—P. T. Taylor, S. F.
498,692.—NECKTIE FASTENER.—C. F. Ware, San Rafael, Cal.
498,597.—SEPARATOR.—F. H. Wheeler, Santa Barbara, Cal.
498,599.—SPRAY NOZZLE.—A. W. White, San Jose, Cal.
The following brief list by telegraph, for June 6, will appear more complete on receipt of mail advices:
California.—Hans G. Bshir, San Francisco, dynamometer; James H. Burrell and W. J. Doldge, Wright, machine for picking prunes or plums; Wilson Carey, Forest Hill, hand punch; Nathaniel M. P. Cose, Tustin, label-printing machine; Robert Franken, Pomona, hose-fastener; George Grisel, San Francisco, match-packing machine; Rudolf Hagen, San Francisco, faucet and faucet attachment; Benjamin Holt, Stockton, traveling thresher, also traction engine; Joseph B. Jordine, San Francisco, apparatus for treating or reducing bituminous substances; Robert J. Kennedy, Redlands, Ferdinand von Leach, Mirabel, water-wheel bucket; Lemuel S. Manning, Alhambra, car coupling; Charles C. Merrill, Riverside, joint.
Arizona.—Joseph L. Giroux, Jerome, furnace.
Washington.—Philip H. Dencor, Sprague, hose coupling; Frank Graham and I. E. Curtis, Easton, convertible stool; Charles Palmley, Seattle, dish-cleanser.
Nevada.—Alfred D. Godbe, Pioche, hobby horse.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EDUCATIONAL CABINET.—Chas. L. Ellis, S. F. No. 493,636. Dated May 30, 1893. The invention relates to that class of educational apparatus in which a traveling strip of paper is confined within a casing and is viewed through a slight aperture. The objects of the invention are by a novel arrangement of the paper and the disposition of its supporting and guiding parts, to present a perfectly smooth, unwrinkled surface, to prevent the sagging of the paper and to hold it close up to the sight aperture, to confine the paper roll closely and guide it accurately in unrolling, and generally so to simplify the device so that its construction shall be practical and economical.

SAW-HANDLE.—Marshall M. Cope, Noyo, Mendocino Co. No. 498,626. Dated May 30, 1893. This is one of that class of saw-handles adapted to be readily fitted and adjusted to the saw and removed again when necessary. The invention consists in a stock having a forward-projecting flange provided with holding pins or lugs for engaging the holes in the saw-blade, a sliding clamp fitted to the stock and adapted to bear on the rear edge of saw and hold it tightly on the pins, and an oscillatory handle in the rear end of the stock provided or formed with a cam acting against the sliding clamp to force it to its work and to relieve it.

SPRAY-NOZZLE.—Archibald W. White, San Jose. No. 498,599. Dated May 30, 1893. The invention relates to spray nozzle of that class which are employed to discharge a spray upon trees, vines and plants for the purpose of destroying noxious insects or parasites, and it consists in the combination with the device of a strainer by which any solid matter may be held back and kept from passing into the nozzle, and also in a means for adjusting said strainer and in certain details of construction. The spray thrown by these nozzles should be exceedingly fine, and the very small holes required are easily stopped up, requiring stoppages for cleaning, but this invention obviates this.

SEWER-CLEANING BRUSH.—Septer E. Johnston, Selma, Fresno Co. No. 498,659. Dated May 30, 1893. This device is especially adapted for cleaning out vitrified stone and other sewer pipes. It consists of a peculiarly constructed brush having attachments at its ends, whereby it can be drawn backward and forward through the sewer to be cleaned. The brush is easily cleaned and the interior of the tube serves as a channel through which the water can flow constantly while the brushes are at work. By reason of the peculiar construction and the swivels at the ends of the rod the brush will be caused to rotate slowly as it is dragged through the pipe.

Market Reports.

The Markets.

SAN FRANCISCO, June 8, 1893.

Government Silver Purchases.

The Government purchases of silver for the month of May were as follows:

Date.	Price.	Ounces.
May 1.....	84.00 to 84.33	320,000
May 3.....	84.35 to 84.45	450,000
May 5.....	83.60 to 83.80	169,000
May 8.....	84.20 to 84.40	454,000
May 10.....	83.95 to 84.10	560,000
May 12.....	83.90 to 84.10	365,000
May 15.....	83.78 to 83.90	97,000
May 17.....	82.98 to 83.00	300,000
May 19.....	83.30 to 83.40	360,000
May 22.....	82.25 to 83.34	360,000
May 24.....	82.93 to 83.00	181,000
May 26.....	82.90 to 82.98	416,500
May 29.....	82.88 to —	100,000

Public awards.....4,132,500
Private purchases.....367,500

Total.....4,500,000

Purchases for account of June were begun on the 2d. Further awards were made to-day. The purchases will be continued on Mondays, Wednesdays and Fridays until the whole quota for the month has been secured.

Gold Coin Movements.

The gold coin movement of this port for the month of May may be stated as follows:

Coining in May.....	\$1,620,000
Paid in for duties.....	\$ 582,400
Exported.....	1,113,200

Total.....1,695,600

Loss to local circulation.....\$75,000

Extending the comparison to cover the first five months of the year, we have the following:

Coined Jan. 1 to May 31.....	\$10,180,000
Paid in for duties.....	\$3,017,500
Exported.....	6,708,300

Total.....9,725,800

Added to local circulation.....\$454,200

For the same time last year, the loss to local circulation was \$3,751,400.

Coinage at the San Francisco Mint.

The coinage at the San Francisco Mint for May compares as follows:

	1892.	1893.
Double Eagles.....	\$ 1,180,000	\$1,180,000
Eagles.....	440,000	440,000
Half Eagles.....	979,500	979,500
Standard Dollars.....	100,000	100,000
Quarter Dollars.....	60,000	60,000
Dimes.....	60,000	60,000

Total.....\$1,079,500

Total.....\$1,740,000

The coinage for the first eleven months of the fiscal year compares as follows:

	1891-92.	1892-93.
Double Eagles.....	\$24,565,000	\$18,220,000
Eagles.....	980,000	980,000
Half Eagles.....	1,079,500	1,252,500
Standard Dollars.....	770,000	700,000
Half Dollars.....	218,000	198,720
Quarter Dollars.....	676,020	179,000
Dimes.....	326,170	122,901

Total.....\$23,634,190

Total.....\$21,653,121

San Francisco Metal and Coal Market.

ANTIMONY.

Per lb.....	@ 14
Refined, in car lots.....	@ 7 1/2
Flashed, do.....	@ 6 1/2
Concentrated, do.....	@ 6
All grades in bulk at advance.	See Oils.

COOPER.

Bolt.....	@ 22
Sheathing.....	@ 22
Ingot, jobbing.....	@ 14 1/2
Do, wholesale.....	@ 13 1/2
Fire Box Sheets.....	@ 22

IRON.

Bar, base.....	@ 3
Nirway, base.....	@ 4 1/2
Spot.....	@ 4 1/2

STEEL.

English, do.....	@ 18 1/2
Antion tool.....	@ 18 1/2
Refined, in car lots.....	@ 18 1/2
Flashed, do.....	@ 18 1/2
Concentrated, do.....	@ 18 1/2

TINPLATE.

Bolt.....	@ 22
Sheathing.....	@ 22
Ingot, jobbing.....	@ 14 1/2
Do, wholesale.....	@ 13 1/2
Fire Box Sheets.....	@ 22

PIG IRON.

Spot.....	@ 22
Bar, base.....	@ 3
Nirway, base.....	@ 4 1/2
Spot.....	@ 4 1/2

COAL.

Spot.....	@ 22
Bar, base.....	@ 3
Nirway, base.....	@ 4 1/2
Spot.....	@ 4 1/2

THE METALS.—Tin has developed considerable strength, after a long period of weakness. Lead shows no change. Copper is steady.

New York, June 1.—Following are the closing prices for the week:

	London.	N. Y.	Copper.	Lead.	Tin.
Thursday.....	37 1/2	82 1/2	10 85	3 92 1/2	19 00
Friday.....	37 1/2	82 1/2	10 80	3 92 1/2	19 00
Saturday.....	37 1/2	82 1/2	10 80	3 92 1/2	19 00
Monday.....	37 1/2	82 1/2	10 80	3 92 1/2	19 00
Tuesday.....	38	81 1/2	10 80	3 92 1/2	19 00
Wednesday.....	38 1/2	83 1/2	10 80	3 80	19 60

Fine Silver Prices.

Fine silver was quoted on the first of May at 37-1/2 in London and 83 1/2 in New York. The

price was a trifle higher on the following day, but afterwards receded. The lowest point was reached on the 17th, when the quotation was 37 1/2 in London, and on the preceding day 82 1/2 in New York. On the 31st of May, the price was 37-1/2 in London and 82 1/2 in New York. The extremes in both markets for the first five months of the year were as follows:

	—London—		—New York—	
	High.	Low.	High.	Low.
January.	38 9-16	38 2-18	84 c	82½c
February.	38 8-16	38 2-16	84½	83½
March.	38 6-16	37 9-16	88½	81½
April.	38 5-16	37 4-16	83½	82½
May.	38 9-16	37 8-16	82½	82½

In May, 1892, the extremes in London were 40 1/2 to 39-11-16, and for the first five months of that year 43-12-16 to 39d.

Mining Share Market.

Little of special interest has occurred this week in the mining share market.

The monthly statements of the financial condition of the mining companies, sworn to by presidents and secretaries, were filed at the proper time. The following companies report having cash on hand June 1, 1893: Andes, \$14,492.76; Alta, \$13,933; Alpha, Con., \$119.67; Best & Belcher, \$18,320; Bullion, \$15,716.43; Bodie Con., \$11,155.55; Belcher, \$10,651.91; Consolidated California & Virginia, \$91,993.51; Consolidated Imperial, \$2604.87; Crocker, \$323.47; Crown Point, \$1970.85; Challenge Con., \$3051.24; Chollar, \$3609.40; Caledonia, \$9166.68; Exchequer, \$3507.91; Gould & Curry, \$17,767.01; Hale & Norcross, \$897.16; Lady Washington, \$6800; Mexican, \$13,331.51; Mono, \$5781.93; Nevada Queen, \$834.24; Occidental Consolidated, \$914.42; Ophir, \$11,051.04; Peer, \$433; Peerless, \$915.74; Savage, \$12,727.03; Sierra Nevada, \$15,073.92; Seg Belcher, \$3448.53; Scorpion, \$1871.6; Silver Hill, \$341.96; Union Consolidated, \$16,383; Utah Consolidated, \$2360.54; and Weldon, \$502.99. Standard Con., \$42,001.95; Syndicate, \$16,571; North Commonweal, \$229.86; and Julia Con., \$1610.60. The following additional companies report having had an indebtedness June 1, 1893: Belle Isle, \$6309.86; Del Monte, \$24,547.75; Navajo, \$11,524.36; North Belle Isle, \$7401.39; and Silver King, \$3966.29.

The following mining companies report having had an indebtedness June 1, 1893: Bulwer Con., \$4,117.38; Confidence, \$606.90; Commonwealth, \$26,570.91; Consolidated New York, \$14.34; Grand Prize, \$741.60; Kentuck, \$429.36; Overman, \$19,273.41, with \$17,798.51 to be collected on the pending assessment; Pitoe, \$20,911.02.

In conversation with Col. Hayward, a reporter was told the Potosi mine continues to show steady and general improvement. The 930-foot level has turned out to be a much better level than the 1000. The large station for the upraise in the ore body in the north drift on the 930-foot level will soon be completed, and the raise, which will be of two compartments, will be carried up in the ore body. The development work in the mine has been slow, on account of a poor supply of air, but Col. Hayward said that they would remedy this ere long. Arrangements are being made to increase the bullion yield and thus reduce the indebtedness of the company, which is now about \$20,000.

The Mount Diablo mine has been shut down for an indefinite period. The company's mill at Soda Springs is now being cleaned up and will soon suspend operations.

For the month of May the mining and other corporations on and around the Comstock paid out \$101,171 for labor. That sum was \$5472.54 less than the amount paid out for April.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, June 8, 1893.

9:30 A. M. SESSION.

200 Alpha.....	50c	750 Hale & Norcross.....	65c
200 Andes.....	30c	100 Kentuck.....	30c
300 Belcher.....	1.35	1300.....	25c
100 Best & B.....	1.05	450 Mexican.....	1.15
500 Bullion.....	55c	300 Ophir.....	1.70
100 Chalene.....	35c	150 Overman.....	1.70
300 Chollar.....	1.00	400 Savage.....	70c
100 Con. Cal. & Va.....	1.75	100 Sierra Nevada.....	85c
45 Crown Point.....	30c	300 Union.....	85c
100.....	30c	200 Yellow Jacket.....	1.45
150 Gould & Curry.....	80c	500.....	1.40

2:30 P. M. SESSION.

100 Ophir.....	1.75	400.....	1.60
150 Mexican.....	1.25	1570.....	1.70
400 Gould & Curry.....	.95c	300 Kentuck.....	.35c
100 Best & B.....	1.10	1600.....	.30c
100.....	1.15	100.....	.40c
200 Savage.....	.75c	500 Belcher.....	.35c
300 Chollar.....	1.05	10 Confidence.....	1.20
150 Potosi.....	2.35	100.....	.10c
150.....	2.50	100 Utah.....	.10c
50 Hale & Norcross.....	.70c	100 Exchequer.....	.05c
900 Crown Point.....	.85c	100 Justice.....	.05c
100 Yellow Jacket.....	1.55	500 Challenge.....	.40c
500.....	1.55	100 Bullion.....	.70c

THE CHRISTIAN ENDEAVOR EXCURSION To the World's Fair!

Will leave on Tuesday, June 20th, under the management of the "Young People's" Society of Christian Endeavor, via Salt Lake, Mantion (Pike's Peak), and Denver. Special features as to stop overs and accommodations! B. to Palace and Tourist Sleepers! Secure an itinerary of the trip. W. A. SISELL, G. P., 850 Market Street, (Chronicle Building), San Francisco, Cal.

METALLURGICAL CHEMIST.

I am desirous of erecting or superintending a large CYANIDE LEACHING PLANT for Gold Ores or Tailings. Thirty years practical experience in Leaching. For the past two years in Cyanide Leaching exclusively. Address "METALLURGIST" This Office.

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FRUE CONCENTRATORS. (Second-Hand Machines, with New Belts.)

SECOND-HAND ENGINES

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High Speed and Slide Valve.

SECOND-HAND PUMP (In Good Order).

Boiler Feed and Elevator.

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No. AMT. LEVIED, DELINQ. TAND. SALE.	SECRETARY.
Ada Cons M Co, Utah.....	1c.....May 10, June 10, June 25.....	J H Cripps, Salt Lake City
Alpha Cons M Co, Nevada.....	11c.....May 10, June 14, July 6.....	C E Elliott, 309 Montgomery
Alta M Co, Nev.....	43c.....April 25, June 21, July 12.....	L Osborn, 309 Montgomery
Big Hole Placer M Co, Utah.....	1c.....April 11, May 15, June 16.....	J Medley, Salt Lake City
Chollar M Co, Nevada.....	3c.....April 17, May 23, June 13.....	C E Elliott, 309 Montgomery
Cons New York M Co, Nevada.....	10c.....May 12, June 16, July 10.....	C E Elliott, 309 Montgomery
Cons St Gothard M Co, California.....	8c.....May 11, June 15, July 6.....	T Wetzel, 32 Sansome
Eclipse M Co, California.....	4c.....May 11, June 15, July 6.....	O Tum Siden, 216 Bush
El Estrella M Co, M. also.....	3c.....May 23, July 1, July 20.....	Jabor Howes, 214 Pine
Gray Eagle M Co, Cal.....	3c.....April 5, May 30, June 20.....	C H Harvey, 309 Montgomery
Imperial Marble Co, Cal.....	23c.....May 22, June 25, July 20.....	W W Sargent, Mills Bldg
Ju-then M Co, Nevada.....	54c.....May 15, June 19, July 7.....	R E Kelly, 309 Montgomery
Lady Washington Cons M Co, Nevada.....	3c.....April 18, May 23, June 13.....	L Osborn, 309 Montgomery
North Belle Isle M Co, Nevada.....	23c.....April 17, May 23, June 23.....	J W Pew, 310 Pine
Overman M Co, Nevada.....	67c.....April 28, June 2, June 23.....	G D Edwards, 414 California
Silver Hill M Co, Nevada.....	33c.....May 29, July 5, July 28.....	D C Bates, 309 Montgomery
Siskiyoun Cons M Co, California.....	5c.....April 28, May 31, June 23.....	E F Stone, 306 Pine
Valencuela M Co, Mexico.....	1c.....May 5, June 8, June 26.....	A E Bull, 421 California

MEETINGS.

COMPANY AND LOCATION.	MEETING. SECRETARY AND OFFICE IN S. F.	DATE.
Alaska Roadwell M Co, Alaska.....	Annual.....A T Corrus, Mills Bldg.....	June 21
Gold Hill M Co, Nevada.....	Annual.....C A Grow, Mills Bldg.....	June 21
Homestake M Co, Dakota.....	Annual.....I O Stuart, Mills Bldg.....	June 13

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.....	5c.....	L Osborn, 309 Montgomery.....	Oct 20
Champion M Co, California.....	10c.....	T Wetzel, 310 Pine.....	May 15
Cons New York M Co, Nevada.....	10c.....	C E Elliott, 309 Montgomery.....	Feb 15
East Western Quicksilver M Co.....	25c.....	A Halsey, 328 Montgomery.....	Oct 8
Mayflower Gravel M Co, California.....	10c.....	D M Kent, 330 Pine.....	May 18
Pacific Coast Borax Co, California.....	100c.....	A H Clough, 320 Montgomery.....	Jan 10
Standard Cons M Co, California.....	10c.....	J W Pew, 310 Pine.....	Dec 23

WHO PAY TOLL?



Mill Owners Who Don't

USE THE CELEBRATED

BRYAN ROLLER QUARTZ MILLS.

HOW?

BECAUSE it is the simplest Roller Mill made, therefore IT SAVES IN RUNNING EXPENSES.

BECAUSE it is the only Roller Mill made in which oil is prevented from dripping into the pulp (oil makes it impossible for the quicksilver to amalgamate with the gold), therefore IT SAVES THE GOLD FROM GOING INTO THE TAILINGS.

BECAUSE—well, there are too many ways of paying toll, and besides it would only weary you to read of them.

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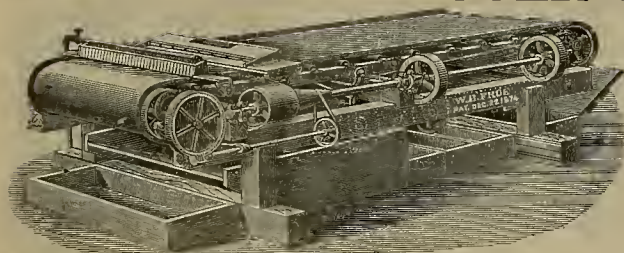
July 12, 1890.

State of California, City and County of San Francisco—ss.: On this 12th day of July, in the year one thousand eight hundred and ninety, before me, George T. Knox, a Notary Public in and for said

FRUE ORE CONCENTRATOR

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Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



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 P. O. Address, South Riverside, San Bernardino Co., Cal.
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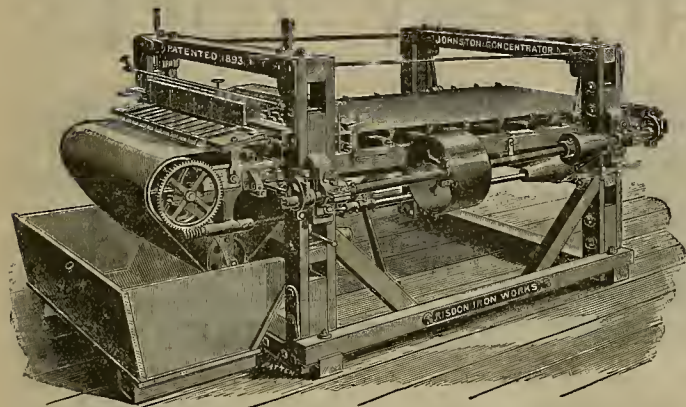
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The points of excellence are briefly as follows:

SIMPLICITY OF CONSTRUCTION,

GREAT DURABILITY, EASE OF OPERATION.

INCREASED PERCENTAGE OF SULPHURETS SAVED.

We might have gone into columns of explanation, but it is doubtful if you would be better convinced of its merits than by reading the following testimonial:

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 Forest Hill, Cal., March 28, 1893. (Signed) J. L. GRIMES, Supt. Drummond Mine.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVI. — Number 24.
OWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 17, 1893.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

Mine Bell Signals.

The law passed by the last Legislature, known as the Voorhies Act, requires the use of a uniform system of mine bell signals in every mine in the State where any signals at all have to be used. The object of this law is to avoid confusion in signals, so that when miners go from one mine to another they will not have to learn a new local code. Some superintendents object to the new signal system as too complicated, but as the law requires it to be used, the objections amount to nothing. Section 3 of the law says: "Any person or company failing to carry out the provisions of this Act shall be responsible for all damages arising to or incurred by any person working in said mine during the time of such failure."

The foreman is compelled, under this law, to see that one printed sheet of these signals and rules for each level, and one for the engine-room, are attached to a board not less than 12 by 36 inches, and securely fasten the board up where the signals can be easily read at the places stated.

With the MINING AND SCIENTIFIC PRESS of last week we sent a supplement containing the signals and rules, printed in full legal size, and stated that copies on cloth could be procured at this office for 50 cents each. A number of orders have been received for these. Mining superintendents are reminded that the posting of these signals and rules is compulsory.

THE Alaska-Treadwell Gold Mining Company paid a bonus dividend of 37½c. per share on the 12th, the same amounting to \$75,000. This is equal to the one-hundredth part of the price paid by the United States Government for the whole territory of Alaska. The mine has been paying regular dividends for some time, and has the reputation of mining and milling its gold ore as cheap as any company in the United States. It is owned largely by California men and the mill, water-wheels, concentrators and all the machinery was designed and built in San Francisco. The officers and white miners are all California men. A good deal of the labor employed is "Siwash" or Indian. The mine is really a big quarry of low-grade gold ore. There is free water power and supplies are landed on Douglas Island for about the same rates of freight that the railroads charge now to Grassy Valley. This is an advantage

of ocean transportation. The mine is equipped with one of the largest milling plants in the United States.

CAPTAIN H. L. HOWISON, Commandant of the Mare Island Navy Yard, who was president of the Naval Board of Inspectors that conducted the final trial trip of the coast defense monitor Monterey, has received word from Washington that the report rendered by the board is highly satisfactory in every particular to the Department, and that the official announcement of the final acceptance by the Navy Department of the Monterey

The Jarecki Pipe Machine.

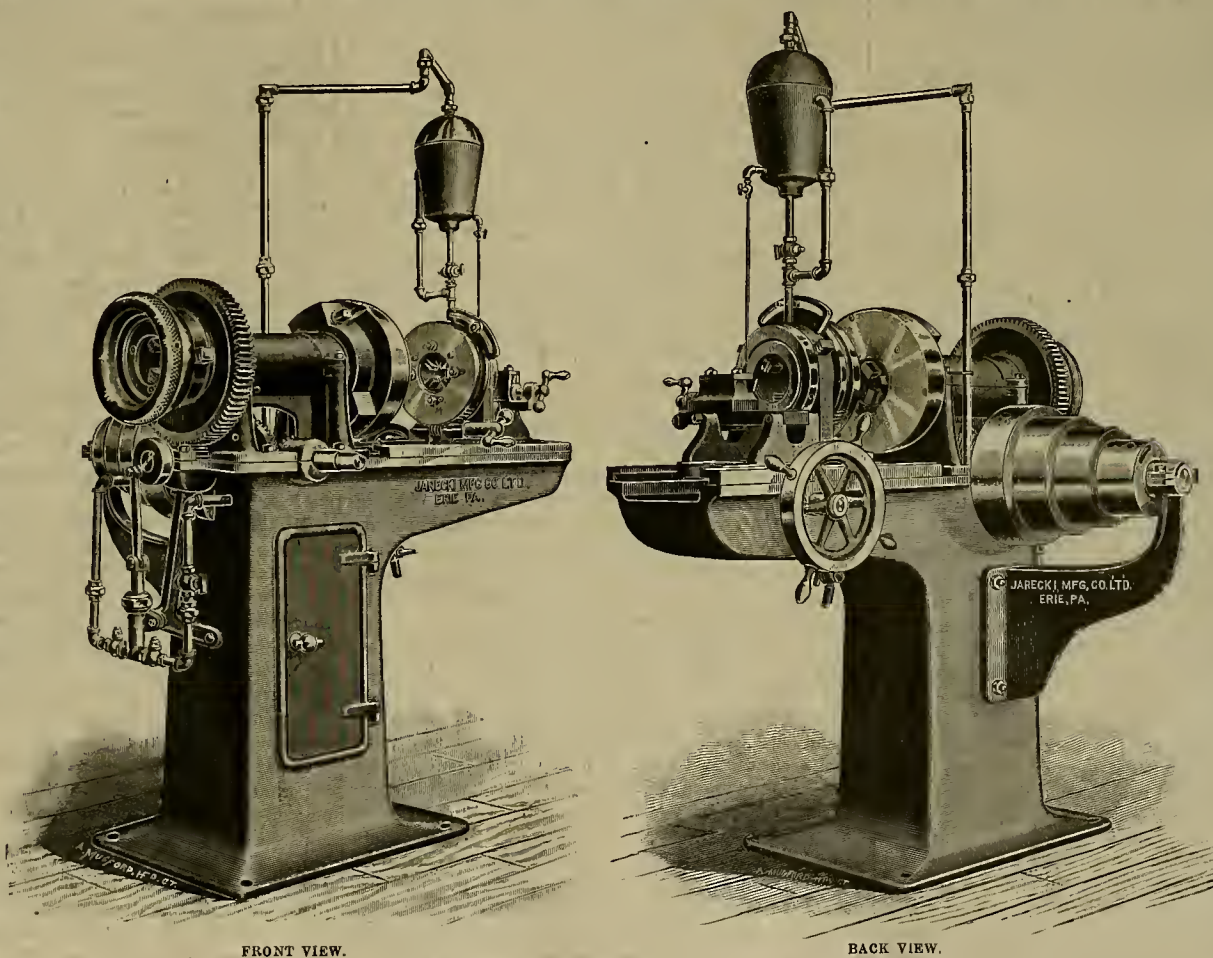
The pipe threading and cutting machine of this type are made in several forms and are very convenient tools. The dies are quick opening and adjustable. Each set of four pieces cuts two sizes of pipe, which is a great point in favor of the machine when new dies are required. After the pipe is threaded there is no hacking off the dies as in the ordinary manner. All that is necessary is to open the dies and run the die head back. If the pipe is to be cut off the dies will expand far enough to admit of the pipe

passing through them to the cutting-off knife. When the dies require sharpening they can be quickly removed and ground on any ordinary grindstone. The die head is also provided with an adjustable stop pin, which is very convenient when a large number of threads of the same size are to be cut. Ordinarily every time a thread is to be cut the dies must be carefully reset. With this adjustable stop the dies are first set to the size to be threaded, then the adjustable stop moved and secured, which will only allow the cam to move to the point required to thread the proper size without the necessity of carefully resetting for every thread that is to be cut. The pump insures a steady supply of oil to lubricate the dies and knife.

There are no loose bushings on the machine which when required cannot be found. There is on the back end of the spindle an adjustable self-centering chuck to center the pipe. There is also one on the die head to steady the pipe when being cut with the cutting-off knife. The gripping chuck is self-centering, too, and very powerful. The Parke & Lacy Company of this city are agents for these machines and others made by the Jarecki Manufacturing Company.

THE ship Elmbank, which came to this port with a cargo of 1000 tons of coal and 2400 tons of sulphur, had a fire break out in the sulphur after arrival here. The water from the engines did no good, and Prof. Price arranged barrels on deck in which carbonic acid gas was generated, which was run into the hold and the fire thus extinguished.

THE Oakland Board of Health has decided to ask the City Council to appropriate \$15,000 for a garbage crematory and \$8000 to purchase a site.



FRONT VIEW.

BACK VIEW.

THE JARECKI PIPE THREADING AND CUTTING MACHINE.

is but a matter of a few days. This is a subject of congratulation in view of the false statements made about the results of this trial. The board found no defect in the hull or fittings, except some few minor details. There was no defect in the machinery or boilers of any kind. We are very glad that this is so. The Union Iron Works of this city made a first-class job with this vessel, and deserves both the credit and the money. It seems strange that misrepresentations should have been made when the truth was bound to come out in the end.

MCCARTHY'S QUICKSILVER MINE on Cinnabar Hill has petered. After a month's practice as a miner Mr. McCarthy has become convinced that there is no fortune for him below the surface, and all the blue rock that has come up out of that thirty-foot shaft and forty-foot drift will be replaced. McCarthy's mine will become a part of San Francisco's history, but its owner will not be able to make even a well out of it, as the water supply gave out long ago.

MINING AND SCIENTIFIC PRESS.

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W. B. EWER, }
CHAS. G. YALE, }.....EDITORS

Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, June 17, 1893.

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Comment.

Any miner who works a hydraulic mine, large or small, without a license from the duly authorized Commission, is a very foolish man, as he is liable to severe penalties. The Caminetti Act was approved on March 1st and the penalty clause came into effect on May 1st. It is perfectly true that the Commission was not organized on that date and was not ready to issue licenses, so it was not the miner's fault. At the same time the law is very plain in providing that hydraulic mines shall not be worked without a license after May 1st. Therefore any one conducting his mine by the hydraulic method now is doing so in violation of the law. There may be an exception or two in the cases of those mines which are working by direct permission of the courts, or in those where the debris can not ultimately get into the streams; but, generally speaking, those hydraulic claims being worked on the drainage basins of the Sacramento and San Joaquin rivers are doing so in violation of the law. There has been plenty of warning and those who now violate the law will get no sympathy if they are punished, and deserve none. Hydraulic mining is now a legal, legitimate industry, under certain specified conditions, but may not be carried on in portions of this State without complying with those conditions. Miners who evade or defy the law will be apt to be punished, and their punishment is easier under the new law than before it was passed. All trouble can be avoided by asking for a license to mine and waiting until it is issued.

The California Debris Commission have received several petitions for license to mine by the hydraulic process, but as yet nothing has been done with them. The Commission, though organized, is not quite ready to make examinations of mines. Certain inquiries have been made and pending the answers from Washington no active steps will be taken. In a week or ten days more, however, all the preliminary details will have been arranged, and the Commission will go on with its work. In another column we print the revised rules of procedure before the Commission. Some slight changes have been made in those printed last week. Those miners who wish to be ready for the next season, should make the necessary petitions as soon as practicable, since, as has been stated in the PRESS, it takes several months to arrange matters and issue the license. While the Commission will not necessarily visit the mines in the order of their applications, those who ask first are, of course, apt to be served first. To reduce the traveling feature as much as possible, whoever visits the mines will examine as many as he can on each trip, so if there are several in one district they will all be visited at one time.

RIVERSIDE is shortly to have an electric railway system, as a corporation has been formed and a franchise asked for the construction of a line in the principal streets of the city. The capital stock of the corporation is \$250,000.

The Water and Electric Power Plant at Bodie.

In July of last year the Standard Mining Co., of Bodie, determined to install a water and electric power plant to furnish motive power for the stamp mill and do away with the use of steam in consequence of the excessive cost of wood at Bodie. This work has now been completed. An excellent water-power was found at Green creek, a mountain stream on the north slope of Castle Peak in the Sierra Nevada, forming one of the chief sources of the East Walker river, and arrangements were made with the owner, Mr. T. B. Hickey, granting the company perpetual right to its use for power purposes, under very favorable conditions. This stream carries 500 miner's inches of water at its lowest stage, which is more than enough for the mining company's purposes, and runs six or eight times that amount at the time of melting snows. An old ditch was cleared out and practically rebuilt for a length of nearly one mile, and a site selected for a power-house at 355 feet vertically below the lower end of the ditch. The work of clearing the ditch, building dam, head-gate, waste-weirs, flume and penstock, the power-house and of laying and anchoring the pipe was pushed during the months of August, September and October, and in November the water-wheels were put in place, so that the first of December saw the water-power planted completed and ready to run.

At the same time this was building, the pole-line was constructed following a straight line 12½ miles in length over the mountains from the mill to the power-house, the copper wire was strung thereon, and 14 miles of telephone line was built between the Bodie office and the power-house, but at a distance from the power line in order to avoid induction and consequent bad service of the telephones. The motor foundations were also put in at the mill, and a motor room (26 feet by 18 feet) built.

Lumber and other material from the dismantled Bulwer-Standard mill was used in construction of Green Creek, thereby greatly reducing the cost. The power-house (30 feet by 40 feet in size) was the former salt house, and the penstock, or pressure tank, was one of the water tanks at that mill, while the steel receiver at the lower end of the pipe was made at the mine from an unused steam-drum. The ditch is 4558 feet long and is connected with a penstock by a short piece of flume fitted with the usual screen, sand-box waste-weir and flushing-off gate.

The pipe leads into a steel receiver, 40 inches in diameter by 9 feet 8 inches long, from which four taper pipes lead the water under pressure of 350 feet vertical head on to as many 21-inch Pelton water wheels, each pipe being fitted with two nozzles, and each wheel capable of developing 62½ horse-power. The wheels run at 865 revolutions, and the wheel-shaft will be connected by a patent insulating coupling to the armature shaft of a Westinghouse, 120 kilowatt alternating dynamo, generating current at 3530 volts. A Doolittle governor is attached to the wheels, and a No. 2 Pelton motor has also been put in to run the "exciter," required for generating the initial current in the fields of the large machine.

The pole line from dynamo to motor is 67,752 feet long, or 12 46-100 miles. The poles are of round tamarack timber 21 feet long, 5 inches in diameter at the top, 25 feet poles being used through the town, and where the ground required it. They are spaced 100 feet apart, and fitted each with a 4-inch by 6-inch by 4 feet cross-arm boxed into the top of the pole, and fastened with one bolt and one lag screw. The wire is of No. 1 B. & S. gauge soft drawn bare copper, and is attached to a standard double petticoat deep-grooved glass insulators, carried on "Klein Patent" ¼ inch by 8 inch iron pins. The wire used is of large section, but the distance of transmission is just at the midway point where cost of converters about equals the difference in cost between a No. 1 and a No. 6 wire, hence it is better to use a higher potential and large wire and avoid the complicated and often troublesome converter. The loss of potential on the line is estimated at 15 per cent, and the current delivered to the motor will therefore be of 3000 volts tension. The motor is of 120 horse-power, and will be brought up to speed by a small motor of 3 to 4 horse-power, which is built on the same bedplate with the larger, and thrown out of circuit as soon as the latter is running at the proper speed, or in synchronism with the generator at the power-house.

Two transformers (ratio 30 to 1) of 100 incandescent lights capacity each will be used for lighting the mill and company's offices are Bodie. With good water-power available and wood costing \$10 per cord at the mill, giving a monthly fuel bill often exceeding \$2000, the economy of this electrical power plant is self-evident. A statement of the cost of this plant will be useful to other mining companies. Legal expenses and consulting electricians cost \$295; general expenses, \$139.35; ditch, \$1787; penstock, \$363.13; roads and bridges, \$203.25; pipe line, \$3490.30; power-house, \$807.04; water-wheels and found-

ations, \$2105.16; wire line from power-house to mill, \$3094.16; pins and insulators, \$291.69; wire, \$6968.40; telephone line, \$1069.92; motor room at mill, \$527.93; machinery for connecting motor to mill shafting, \$1263.32; watchman, \$180; total expenditures, \$22,584.63. The total cost per mile was \$840.63.

Sacramento and Hydraulic Mining.

At a meeting of the Executive Committee of the State Miners' Association, on Friday of last week, Mr. Ingram, a merchant of Sacramento, was present, as bearer of the following communication from wholesale merchants of Sacramento:

SACRAMENTO (Cal.), June 8, 1893.

Hon. J. H. Neff, President of the California Miners' Association, San Francisco—DEAR SIR: We are in receipt of your communication inviting us to be present at a meeting of the Miners' Association to be held June 9th. We beg to thank you for the courtesy shown, but owing to the limited time and absence from the city of many merchants interested, we are unable to have a full meeting to consider the very important subject of mining. However, the undersigned met last evening and discussed the subject in an informal way. From the information in our possession we understand that the present mining laws are satisfactory to the mining interests, and that mining can be safely resumed under the existing laws.

If such be the case, we are unanimously of the opinion that the laws should be given a thorough trial. We are also satisfied that the merchants of Sacramento generally are in sympathy with the miners and their interests, and want to see mining continued without molestation, provided the operations be so conducted that no injury to our rivers will result therefrom. Wishing your Association success, we are, respectfully yours,

L. S. ADAMS & CO.,

HOLBROOK, MERRILL & STETSON,

CAPITAL SOAP COMPANY,

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This communication has since aroused considerable discussion in the valley papers, especially as the statement was made by Mr. Ingram that the Chairman of the Board of Supervisors of Sacramento had told him that on August 1st the Board will cease to appropriate money for the Anti-Debris Association.

Mr. Morrison denies that Sacramento is to withdraw its support from the Anti-Debris Association, but thinks the Caminetti law goes into effect in August, and there will then be no occasion for further litigation if the miners abide by its terms. Chairman Morrison says: "If the bill proves what it promises, and the miners do their part, there will be no need of further fighting. We are not fighting the Caminetti bill—there are some miners who don't want to wait until that law goes into effect, and those miners we are going to help shut down. The expression of our Board, and of the entire Association, is that we shall abide by the Caminetti bill. Our county shall continue contributing to the Anti-Debris Association until that bill goes into effect, and the miners proceed accordingly and confine their debris from destroying our river."

Mr. Morrison evidently did not know that the new law has already gone into effect, hence the misunderstanding.

This whole matter was brought up because a few miners had ceased to buy goods in Sacramento for the reason that they thought the merchants there were contributing to an association inimical to the miners' interests. The Miners' Association had nothing whatever to do with this, nor is there any organized movement among the miners. The owners of certain mines, however, did decide to buy no more mine supplies in Sacramento.

In our opinion this matter has been made to seem more important than it really is. No one can blame Sacramento for trying to preserve the river and opposing all miners who will injure the stream by their mining operations. The idea prevails, however, that the Anti-Debris Association intends to obstruct miners on general principles and contest all the applications for license presented to the California Debris Commission, which is to carry out the provisions of the new law. For instance, the Colusa Sun in making suggestions to the valley people says: "The miners cannot move without the commissioners, but we are not bound to accept the conclusions of the commissioners." It angers the miners when they are attempting to comply with the law to find the Anti-Debris Association threatening to contest them just the same as if they were breaking the law. If the miners find the association is not going to do this they will change their minds. If they find, too, that the Sacramento merchants will not aid and support the few anti-debris fanatics who believe in these extreme measures, the whole matter will be amicably settled without further controversy.

EDWARD MORAN has sued the Waterloo Mining Company to recover \$50,000 damages for personal injuries caused by the caving in of a portion of the company's mine in San Bernardino county. Moran was an employe of the company and working in that portion of the mine where the cave occurred. He charges negligence on the part of the company in permitting the mine to be maintained in an unsafe and dangerous condition.

Working Magnetic Iron Sands.

There is a very large deposit of magnetic iron ore on the railroad between Watsonville and Santa Cruz, in Santa Cruz county, about one mile from deep water. There are 202 acres in the tract, and the iron can be shipped either by rail or vessel. Several companies have worked this deposit of black sand for the gold it contains, but thus far none of them have made a success of it. An English company tried working the stuff with the lead bath process, but that was a failure.

The deposit has lately come into the hands of J. E. Taylor, formerly connected with the Portland (Oregon) Amalgamator and Mining Co. He intends working the sand in a new way and has provided the machinery for doing this. The Ball-Norton magnetic separator is used for separating the magnetic iron from the rest of the sand. Mr. Taylor expects to work 1000 tons of the sand per day, and will separate 650 tons a day of the magnetic iron ore, and this he is trying to find a market for in this city.

There is about 20 feet of earth above this beach sand, so the deposit will be "drifted." It can be mined for 15 cents per ton, and Mr. Taylor says will average \$2.50 per ton in gold. The water supply is rather limited and more is to be brought in. The amalgamator which Mr. Taylor is to use is the Raber, which was patented last month by N. L. Raber of Corvallis, Or., and is owned by the Portland Amalgamator and Mining Company. It has been very successful with the fine gold of Snake river, Idaho, and with beach sands. He will use three machines each with a capacity of four tons an hour or 96 tons a day of this sand. The magnetic iron ore is removed by the separator before the sand is worked for the gold in the amalgamator.

The amalgamator has a series of plated steps, across each one of which is a removable mercury trough, and the sand, etc., falls or drops directly from each step into the quicksilver. Above each of these transverse mercury troughs is a feed machine which automatically feeds small quantities of some chemical substance which keeps the quicksilver clean and lively. Mr. Taylor thinks these machines will lose no gold at all. No power is required for them, though each machine requires six miners' inches of water.

Out on the ocean beach south of the Park another set of men, under "Arraste" Johnson began to work a black sand deposit this week. They, too, want to sell the magnetic iron which they separate. Another new amalgamator, one invented by Johnson, is to be used at this claim. They only expect to get \$1.50 a ton from their sand.

We mentioned recently that at Crescent City beach some smelting works were to be put up for smelting the magnetic iron to be separated in operation going on there.

There are several other places on the California coast line where black sand is being worked for the gold. This gold is very fine indeed, and, being mixed in with magnetic iron of almost the same specific gravity as the gold grains, is very difficult to save. However, if there can be found a market for the magnetic iron ore, the magnetic separators can first take out this iron, and the residue can be worked for the gold. But if they cannot sell the iron, the operation will not pay unless the sand is richer than most that is found.

In fact these sands are usually poorer in value than they seem. The gold is in very thin scales and ten cents worth in a pan looks as if it were a dollars worth. This has fooled a good many men. In some places, after storms, when the gold becomes concentrated on the beaches by the action of the waves the sands pay very well indeed. The deposits back from the beaches, however, have to be worked right along. In drifting the sand deposits the work is very different from working in gravel, because when the sand gets dry it sifts down through the lagging and fills the drift. They have to caulk the chinks with moss to keep the sand back. This kind of mining has not paid well at Gold Bluff, where there is a very extensive deposit.

As to the deposit below Aptos, Mr. Taylor is confident that he can obtain \$2.50 per ton in gold. The Ball-Norton separator which he uses has a capacity of 20 tons an hour. They charge an enormous royalty for the use of the machine, however, altogether too big for ordinary beach-sand mines to pay. If they expect these machines to be used extensively here, they will have to make a material reduction in their royalty charges. There are several other forms of magnetic separators, all of which have been described in the MINING AND SCIENTIFIC PRESS by Thos. Edison and John Birkinbine, who have been making extensive experiments with such machines.

The iron from these sands is of very fine quality. As about all the iron we use here now is imported, it would seem as if some means could be adopted to utilize this magnetic iron, of which there is an abundant supply. The Santa Cruz mine alone would furnish more than our total

consumption. The trouble is probably lack of fuel, unless petroleum could be utilized. Works were put up at Saucelito some years ago to smelt this magnetic iron with liquid fuel, but they were not successful. Still, more is now known as to methods of burning the fuel, and it is to be hoped that experiment will show it can now be utilized in connection with the magnetic iron sands of our beaches.

Coast Industrial Notes.

FRESNO has voted \$75,000 bonds to build a high school. The offices of the southern division of the Santa Fe railroad, heretofore located in San Bernardino, are being removed to Los Angeles, to take quarters in the new depot recently erected in that city.

THE Oakland, Alameda and Piedmont Railway Company has received a number of new cars and placed them on its Alameda system. The company has made a new time schedule, and hereafter ten-minute trips between Oakland and Alameda will be in order.

COLFAX voted against the proposition to issue \$3000 in bonds for a schoolhouse, but the citizens have asked the School Trustees to call a special election for the purpose of issuing bonds in the sum of \$10,000 for buying the ground and putting up a school building.

THE new opposition freight steamer between this city and Oakland is going with the passenger business more than was expected and is to issue a commutation ticket for \$1, good for thirty rides. Single fares are now 15 cents. The boat has as much freight as it can carry.

THE Supervisors of Kern county have voted to submit to the people the question of issuing \$230,000 in bonds—\$50,000 for a hall of records, \$15,000 for a high school at Bakersfield, \$15,000 for a county hospital, \$30,000 for bridges and the balance for roads.

CHARLES H. ELLIOTT of Calico has filed a claim for 1,000,000 inches of the water of the Mohave river, to furnish water for the mines at Calico and Alvord, which is to be diverted by a dam across the river and carried by a canal to a natural storage reservoir, a dry lake ten miles from the mines. It is also expected to irrigate a large tract of the land.

THE Cudahy packing plant began slaughtering hogs in Los Angeles last week, when 200 hogs were slaughtered the first day. The works have a capacity of 500 hogs a day. They offer 7½ cents a pound for hogs on the hoof, and the supply is unable to meet the demand. Nor will it be, for there are no hogs in the country.—*Anaheim Gazette.*

THE first of the fourteen large passenger engines ordered by the Southern Pacific for mountain work arrived at Sacramento Wednesday. The new locomotive will be used in the Sierra Nevada and Tehachapi. They carry much more steam than the ordinary engine and have large and heavy driving wheels, which will enable them to pull longer and heavier trains over the grades than the engines now in use.

OF coal we received at this port last week from the coast mines 7398 tons; from foreign ports, 15,790 tons. The shipments recently from our northern collieries have been very light. Coal freights are low enough, as ship-owners claim that dividends are not dreamt of at going rates, and no great advance is expected in price, so that there cannot be much profit on coast coal products in the near future if the present conditions to them are unfavorable.

ACCORDING to statistics the wine merchants of San Francisco made last year about 2,000,000 gallons of dry wine, the wine-growers who market their own product made about 1,500,000 gallons, and the producers who sell their cellars to the wholesale wine merchants of San Francisco about 7,000,000 gallons, or two-thirds of the entire product. Mr. Herman Bendel suggests a combination of the producers which will put their wine into the hands of a Board of Directors who shall handle this wine so that better prices may be obtained by its growers.

ARRANGEMENTS were completed at Yuba City on the 13th inst. for the right of way to construct a canal as a cut-off at the mouth of the Yuba river. This cut-off, as accepted by the government on the recommendation of engineers, is to be 2400 feet long and 400 feet wide, with levees on each side. It will turn the current of the Yuba river into the Feather river at a point some distance below the present mouth of the Yuba, the object being to relieve the river during high water and make a more direct channel. The government will build the canal and work is expected to begin soon.

A PROPOSITION or scheme is on foot to sink a well across the river from Redding, Shasta county, in what is known as "Stinking" canyon, where 'tis said are many good indications of petroleum and gas. A year or so ago there was considerable excitement over the prospect of petroleum being found in that locality, and many locations were made. There was then talk of sinking a well, but it ended in talk; nothing was done and no money expended. Now it appears, however, that there are those who are willing to show their faith by their works, and who will put up a reasonable amount of coin for experimental purposes.

THE steamer Keweenaw, which sailed the other day for Panama, took among other things 503,000 pounds of California borax, which is destined to New York. In the cargo was also 18,000 pounds of antimony. The Willie Rosenfeld, now on the way to this port from Nanaimo, has 3800 tons; the Commodore has 3100 tons and the Kennebec 3500 tons. These are big cargoes. The mines of the Vancouver Company are now turning out 2300 tons daily, and can do better than that if pressed. The sinking of another shaft, which is among the possibilities of the future, will enable an output of 5000 tons daily.

THE Harbor Commissioners last week held an executive session to consider and examine preparations for making

piles used in the State docks teredo-proof. Chairman Bassett, who lately returned from a three-weeks' tour of inspection of all the principal wharves from here south to San Diego, presented a report containing much data. Some of the preparations will be given a trial in the bay. Commissioner Oole insisted upon a reduction in price in the future on all piles coated with paraffine or prepared with creosote; also that the length of piles be measured by a State employee and inspected before accepted.

ALASKA and British Columbia salmon have almost entirely supplanted the Columbia river pack in the foreign markets, and practically the entire pack of the Columbia goes East, where the demand more than keeps pace with the supply. This year Columbia river canners are figuring on a short pack, but it is too early to place great confidence in present estimates. Up to date the pack is behind that of 1892, chiefly on account of the destruction of the traps, a fact hardly to be regretted, as the loss has been in steelheads and other inferior salmon, and so, while the smaller, the average of the pack is much superior to that of 1892.

WORK on the ferry pier of the California and Nevada Railroad is progressing surely if not very rapidly. Already 1400 feet of piling has been driven from the Alameda shore near the Judson Iron Works. Shiploads of lumber will soon arrive and then the work of capping will soon be commenced, the completion of which will greatly facilitate the pile-driving portion of the labor of construction. The wharf will be run out to deep water and will be between two and three miles long. The ferry will tap the electric railway systems of north Oakland and cars of these lines will be run upon the pier to connect with the ferry boats, as well as the trains of the California and Nevada Railroad.

UP on the South Yuba river, about a mile above New York Flat, lie the deposits which may some day make Nevada county famous for its marble. There are four deposits, three of them quite extensive, and they comprise three distinct varieties of marble. There is a large deposit of a blue mottled stone called "dove" marble; black marble of fine quality; a considerable of the ordinary gray marble. This stone takes a very high polish, and that it is durable is shown by samples which have been cut out for twenty years and are still in prime condition. The owners of these valuable deposits are W. H. Kalenberger, N. O. Harmon, J. C. and A. L. Martens and L. W. Hutchins. They fully appreciate the value of their quarries, and this year intend to build a road from their ground down to the old Sailor Flat road, and will put their stone upon the market.

THE San Bernardino City Trustees have entered into a lease for a term of twenty years, by which they obtain from John L. Campbell the use of 100 inches of water for the annual rental of \$4950, with the privilege of buying the right for \$52,000.

Some three years ago the city erected water-works, obtaining the water from artesian wells. Owing to the large number of wells being placed at a point below, the wells of the city diminished in flow, so that costly pumping works had to be erected. Within the last few weeks even the pumping works failed to draw sufficient water for city purposes. The City Trustees propose in the near future to erect an electric light plant for lighting the city, and as the water just obtained by the lease has 100 feet fall before reaching the city reservoir, it will give ample power to light the entire city. The question of voting bonds for the purchase of this water will probably be submitted at an early day.

Mr. Hammond Goes to Africa.

Mr. John Hays Hammond, the well-known mining engineer, has recently returned from a business trip to London. Mr. Hammond has been connected in a professional capacity with many large mining enterprises on this coast, and has for some time been manager of the Bunker Hill and Sullivan mines of Cœur d'Alene, Idaho. He has been a contributor to the reports of the State Mining Bureau of articles of great practical value to miners and millmen. Mr. Hammond is about to leave California for some months and will go to South Africa on professional business. The *South African Mining Journal* has the following to say concerning Mr. Hammond:

"The firm of Messrs. Barnato Bros. may certainly be congratulated upon its choice of Mr. Hays Hammond as its technical adviser and consulting engineer, and it is probable that the high professional reputation which for many years he has deservedly enjoyed will go far to promote public confidence in the future of the companies with which he will be connected. While studying at Friburg it was generally predicted that he would eventually become one of the brightest ornaments of the mining profession, nor has his subsequent career in any way belied his early promise.

"On leaving the University he decided to thoroughly acquaint himself with the details of practical mining work in all its branches, and before practicing his profession served for several years in the mines with this object. At a later date he proceeded to America and soon attained a brilliant reputation, his fame now extending through all the various States of the Union. His attention has recently been chiefly directed to the famous gold mines in the Grass Valley district, California, of which he has acted for many years past as consulting engineer.

"His comprehensive paper upon 'Gold Milling,' reproduced in South Africa in the columns of the *Mining and Metallurgical Review*, will doubtless be remembered as a valuable contribution to the literature of the subject, and it is to be hoped that his investigations upon the Witwatersrand, with regard to this and other similar subjects upon which he is admittedly a high authority, will lead to many useful improvements being effected in the local conditions of mining and milling."

Refractory Metals in the Electric Furnace.

The name of Henri Moissan has figured very prominently in the scientific world during the last few days, and not without reason, the distinguished young French savant has lately made a series of experiments and discoveries whose interest is only equalled by the rapidity with which they have been successively placed before the public through the medium of the celebrated Paris Academie des Sciences. Mons. Moissan read a paper according to which he claims, by means of the electrical furnace capable of generating the extraordinary high temperature of 3000° Cent. that he lately invented, to be able to manufacture the diamond; on February 13th he contributed one memorandum upon a Canyon Diablo diamoodiferous meteorite, and another upon the presence of graphite, carbonado, and microscopic diamonds in the blue earth of Cape Colony; while on February 30th he utilized the furnace mentioned for the purpose of obtaining within ten minutes an ingot of the rare metal uranium weighing 250 grammes. Upon this occasion he pointed out that he had ascertained that a combination of this metal with carbon ignites spontaneously in the atmosphere, yielding a white light; and, by way of practical illustration, he, much to the alarm of his select audience, slyly shook a bottle containing a preparation of this class, with the result that a slight explosion followed. When the tumult engendered by this episode had subsided and the members had resumed their seats, Mons. Moissan exhibited ingots of chrome and manganese prepared in a few minutes in the way the uranium had been, whereas the ordinary reduction processes, he observed, absorb a comparatively long time. All things considered, the French scientist believes that the use of higher temperatures, which can be developed by a dynamo-electric machine actuated by natural water-power, will become an important feature of the art of metallurgy.

Iron gives the following further particulars of Mons. Moissan's process for the ready preparation of large quantities of the more refractory metals by means of the electric furnace. The electric furnace is simply a small furnace constructed of lime, so arranged that it can be intensely heated by a very powerful electric arc. A quantity of magnesia, which Mons. Moissan finds to be perfectly stable even at this high temperature, is first placed in the cavity of the furnace, and upon this is placed the crucible of retort-carbon containing a mixture of powdered carbon and the metallic oxide to be reduced. When the metal is volatile a current of hydrogen is passed through the furnace, and the vaporized metal is condensed in a comparatively cool receiver. In this manner Mons. Moissan has succeeded in rapidly preparing considerable quantities of the metals of the alkaline earths, calcium, strontium, and barium. If the metal is not sensibly volatile it is left in the crucible after the reduction in the form of an ingot. The rare metal uranium and the metals manganese and chromium belong to this category, and their preparation forms the subject of two recent communications by Mons. Moissan.

Metallic uranium was prepared with great difficulty, and only in small quantities by Peligot, by reducing the oxide with an alkali metal. At ordinary procurable temperatures the various oxides of uranium are practically irreducible by carbon. This no longer obtains, however, at the extremely high temperature of a very powerful electric arc. The nitrate of uranium is first calcined in a porcelain crucible, whereby a reddish-colored mixture of the sesquioxide and of green oxide U_2O_3 is obtained. This mixed oxide is then well ground with a very slight excess of powdered carbon, and the whole tightly packed in the crucible of retort-carbon, which is afterward placed in position in the time-furnace. Upon submitting the mixture in the crucible to the action of the arc produced by a current of 450 amperes, the reduction is completely effected in a few minutes.

The ingot of uranium thus produced exhibits a brilliant fracture and great bardness. It possesses the peculiar property of sending forth a shower of incandescent sparks when struck against a piece of porcelain, or when fragments of it are shaken about in a glass flask, reminding one of the combustion of particles of freshly reduced iron when allowed to fall through the air. The yield of the metal is very considerable; thus in one experiment of twelve minutes' duration an ingot weighing over 200 grammes was produced. The metal is not quite free from carbon, the amount of the latter depending upon the excess used. Mons. Moissan is now (*Nature* says) engaged in perfecting a ready mode of refining it.

In order to prepare metallic manganese the protoxide is mixed with carbon in the case of uranium, and the mixture submitted to the arc produced by a current of 300 amperes. The reduction is completely effected in five or six minutes, an ingot of 120 grammes being readily obtained. The comparatively weaker arc derived from a current of only 100 amperes gives the same yield in 10-15 minutes. Any large excess of carbon is to be avoided as carbides of manganese are then produced. If an excess of the oxide is employed the metallic manganese is almost pure, and may be preserved unchanged in open vessels. The carbides, however, are rapidly attacked by the moisture of the atmosphere, and if thrown into water evolve a gaseous mixture of hydrogen and various hydrocarbons.

Chromium has always been found hitherto to be much more difficult to reduce than manganese, but complete reduction occurs in 8 to 10 minutes in the electric furnace, employing a mixture of the sesquioxide and carbon and a current of 350 amperes, the yield being an ingot of 100 grammes. A current of 30 amperes, however, is sufficient to produce ten grammes of the metal in half hour's time. Moreover, it is possible to refine the somewhat impure (from carbide) metal by a simple repetition of the process in presence of a fresh quantity of sesquioxide. The pure chromium thus obtained is completely transformed into the volatile chloride when heated in a stream of chloride. The reduction in the electric arc succeeds equally well with

crude chrome iron ore, on alloy of iron and chromium may very readily be converted into chromate by projecting it into fused nitrate of potash or soda and subsequent extraction with water.

Pennsylvania's Bituminous Coal Regions.

The total production of the bituminous coal regions of Pennsylvania during 1882, according to the reports of inspectors was 46,018,247 tons. The 1st district comprises parts of Allegheny, Washington, Westmoreland and Fayette counties and the whole of Greene county. Henry Louttit, the inspector of this district, reports that there were 24 fatal accidents, an increase of 4 over the previous year. The number of non-fatal accidents reported to the inspector was 67; number of days worked 10,560, and 9393 persons were employed.

The 2nd district comprising parts of Allegheny and Westmoreland counties, has 85 mines which employ 12,009 persons. The number of tons of coal mined for each fatal accident was 320,760, and for each non-fatal accident 195,598.

The 3rd district comprises parts of Indiana, Westmoreland and Jefferson counties and the whole of Armstrong, Butler, Clarion, Lawrence and Mercer counties. There were 2 fatal accidents during the year and 26 non-fatal ones.

The 4th district comprises McKean, Potter, Tioga, Bradford, Sullivan, Lycoming, Clinton, Cameron and Elk counties and a portion of Jefferson county. James N. Patterson, the inspector, reports that the general condition of the mines throughout the district is much improved.

In the 5th district, composed of part of Somerset and Fayette counties, there were 23 fatal accidents and 60 non-fatal accidents. The number of tons of coal produced per life lost was 320,004; number of persons employed per life lost, 280; number of persons employed per non-fatal accident, 107. The 6th district comprises the whole of Blair and Cambria counties and portions of Clearfield, Indiana, Jefferson, Westmoreland and Somerset counties. The number of fatal accidents was 14, an increase of 1 over the previous year. In the 7th district, comprising parts of Allegheny, Washington, and Westmoreland counties, the most of the mines that shipped their product by river transportation were operated but a few months during the year, while some of the railroad mines could not work to their full capacity for want of transportation facilities. The number of fatal accidents and serious personal injuries, inspector Black says, are on the increase in this region, which fact is due to the very large number of foreigners now employed in the mines. The number of fatal accidents during the year was 28, an increase of 8 over the number for the previous year. The number of non fatal accidents was 56, but the inspector adds that it should be taken into consideration that there was a large increase in the production. The quantity of coal produced per life lost was 235,918 tons. In the 8th district, comprising Bedford, Centre, Huntingdon, and a part of Clearfield county, 12 fatalities occurred, and 53 non-fatal accidents.

Canadian Mineral Production.

The Geological Survey Department of Canada has prepared statistics of the mineral productions of the Dominion for each year from 1886 to 1892, which, although showing on the whole a steady increase during the whole period, record a falling off in the case of most minerals last year. The production of copper shows an increase from \$354,000 in 1886 to \$1,160,740 in 1891, but it fell to \$925,589 in 1892. Gold started with \$1,330,482 in 1886 and the output has declined year by year, until in 1892 it amounted to \$900,483. The silver production in 1886 was \$209,090, and steadily increased till 1890, when it was \$402,662, then declined to \$264,510 in 1892. Iron ore to the value of \$126,982 was produced in 1886 and has slowly increased with some fluctuations to \$142,005 in 1891; in 1892 it went up to \$254,206. Nickel statistics are given only for the last three years. The figures are \$933,282, \$2,775,976 and \$3,513,339, a very gratifying increase. The coal production shows an increase. In 1886 the value of the output was \$5,017,225; in 1891 it had gone up to \$8,144,247, but it fell last year to \$7,181,610. In mica the output in 1886 was \$29,008 and it has steadily increased to \$100,923 in 1892. The phosphate production, on the contrary, is decreasing. In 1886 it was \$804,638 worth; in 1891 \$241,603; in 1892 \$157,424. The total output of metallic ores in 1886 was \$2,021,548; 1890, \$3,570,685; in 1891, \$5,551,195; in 1892 \$5,807,049.

The non metallic ore production was \$8,096,719 in 1886; \$14,359,174 in 1891, and \$13,334,267 in 1892, the largest increase being in coal.

DRY WASHING FOR GOLD.—N. G. Hock, a mining expert from Denver, has just returned from the Altar district in Sonora, stopped over in Tombstone on his way home. He gives the *Prospector* some valuable information concerning what he says is the richest district under the sun. There is but one company operating there at present, a New York syndicate. They have 60 dry washers operated by 120 Indians whom they pay 75 cents a day. Their returns average \$1800 per week. The diggings are 60x80 miles in extent and as dry, hot and as barren as the Colorado desert. The nearest water is twenty miles distant and is packed on burros for domestic use. The gold was very coarse. Mr. Hock has several pieces which he was allowed to take from a washer that are worth from \$5 to \$20 each.

He states that many chunks are found mixed with quartz, that are as large as hen's eggs. He saw one piece which weighed ninety-six ounces after the quartz was cleaned from it which was purchased for a trifle from an Indian. One man cleans up the machines every night. He is the only American in the place. The gold is all sold to the merchants around the camp who take their chances in getting it out of the country without losing their lives.—Tombstone Prospector.

Shut-Down at Candelaria.

TO THE EDITOR:—The Mt. Diablo mine of Candelaria suspended operations on the 1st of this month, throwing out of employment about one hundred men at mine and mill. Owing to the steady decline of silver, the mine managers of Candelaria, about a year and a half ago, decided to either discontinue the working of these properties or reduce the wages 50 cents per man.

The proposition was placed before the employees of the Holmes Mining Co. Limited of London and the Mt. Diablo, the two principal mines in Esmeralda county. The men were told that when silver should again advance, the wages would be placed at the old standard. The proposition was instantly rejected by the miners, and both companies shut down.

One year ago the Mt. Diablo Company resumed work on both mine and mill and was run steadily up to the present time.

This county is prolific in her resources, and is rich in minerals, silver predominating; but there is also copper, lead, manganese, sulphur, etc., which can be worked. Owing, however, to the steady depreciation of silver, other industries suffer. It affects not only the miners and millmen, but the ranchers and the miscellaneous people who derive benefit from general mining operations. This country will suffer from Reno, Nev., down to Keeler, Cal., a length of 293 miles. If it were possible for the voting population of the United States to elect as its chief executive a financier instead of some one who looks at things from a Wall-street point of view, it would be better for all concerned. If I were an artist, I would paint a picture and exhibit it at Chicago in the mining department of the World's Fair, where it would attract attention and lead to inquiry. The subject would be "A lone Nevada prospector or miner is appointed to plead in terse English before her ladyship of Justice, whose eyes are bandaged."

Sodaville, Esmeralda Co., Nev., June 10, 1893. REX.

A Gold-Mining Center.

The recent mineral developments at both the east and west end of the valley mean much for Phoenix and the entire valley. Each day's report of the outlook in Superstition mountains has been more glowing than that of the day before, and people were at a loss only to know how much of them were true. Parties who have come down from the mountains say all the reports are true, that the only question is as to the extent of the ore, which they believe to be sufficient to make the largest gold camp in the United States. Further development is necessary to assure this, but the development is going on rapidly, the excitement is becoming more intense and all signs which precede great camps are prevalent.

At the other end of the valley, at the base of the Eagle Tail mountains, there is reason to believe that the greatest deposit of marvelously rich ore in existence has been discovered. It will require no very great amount of development to show this, as it is said that nearly five acres of it lie exposed. Reliable assays show it to contain gold in quantities ranging from \$200 to \$1500, and besides to contain a percentage of copper enough in itself to insure fabulous fortunes.

It is believed that these claims will prove to be the richest in the world, and there is no reason to disbelieve it, except that it appears to be phenomenal and without precedent.—Arizona Republican.

PROSPECTORS AND EASTERN CAPITALISTS.—Every prospect that looks like it might make a mine don't develop into one. It takes capital to develop a prospect into a mine. A man's labor is capital. Why all this nonsense written about Eastern capitalists being bitten in mines? If they put money into a developed mine they can measure its value the same as corn in a crib. If they won't take the pains to find out what they purchase they are not business men. If they purchase a prospect they have no guarantee that they will get their money back, yet on the other hand they may reap a rich harvest by the expenditure of a little money. The man who has the real risk is the one who seeks amid recesses of the mountains for the metals. He risks his life and if he finds nothing his time is gone for naught. He may locate good-looking prospects and spend years opening them up, with his limited means, only to find that there is no pay in it. Eastern people don't put money in mines, only for the expected gain, and if they lose occasionally it is no more than the prospector and real miner does. Is it not a fact that they win oftener than they lose; that millions taken from the western hills finds its way into the pockets of Eastern men?—Mohave County Miner.

C. R. McCLELLAN has been awarded the contract for building the entire line of the Donner and Tahoe Railroad. The length of the road is about ten miles and is to be completed by the first of July. The contract is a big one, including as it does the entire work of grading, filling in cuts and the making ready of a roadbed for a complete railroad. Work will be carried on along the entire length of the line. The ties and rails will be placed in position, beginning at the outer end of the line, as fast as the grading is done; so that by the time the last shovel-full of dirt has been thrown the road will be almost ready for use. By the end of July train loads of logs will be rolling into Truckee, and a new era in lumbering will have been inaugurated.

J. W. DUNLAP and J. W. Woodside, of Modesto, have filed an application with the Board of Supervisors for a franchise for an electric road. If granted a similar franchise will be asked from Tuolumne county. It is proposed to run the road from the San Joaquin river through Modesto and Oakdale to Sonora, a distance of sixty miles. Large quarries of marble and slate will be opened up to the market. The power will be furnished by the Stanislaus river, near Knight's Ferry.

Proceedings Before the California Debris Commission.

In the *Press* of last week we published the rules of procedure formulated by the newly organized California Debris Commission. Some slight changes have since been made by the Commission and we append a copy as revised and corrected. These instructions may be changed at any time as the experience of the Commission dictates:

SAN FRANCISCO, June 8th, 1893.

The California Debris Commission, appointed under the Act of Congress approved March 1, 1893, publishes for the information of all concerned sections 9, 10, 11 and 12 of the law which governs in the matter of presentation of petition and proceedings thereafter:

Sec. 9. That the individual proprietor or proprietors, or in case of a corporation its manager or agent appointed for that purpose, owning mining ground in the territory in the State of California mentioned in section three hereof, which it is desired to work by the hydraulic process, must file with said commission a verified petition, setting forth such facts as will comply with law and rules prescribed by said commission.

Sec. 10. That said petition shall be accompanied by an instrument duly executed and acknowledged, as required by the law of the said State, whereby the owner or owners of such mine or mines surrender to the United States the right and privileges to regulate by law, as provided in this act, or any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the working of said mine or mines shall be restrained, and what amount shall be produced therefrom; it being understood that the surrender aforesaid shall not be construed as in any way affecting the right of such owner or owners to operate said mine or mines by any other process or method now in use in said State: *Provided*, That they shall not interfere with the navigability of the aforesaid rivers.

Sec. 11. That the owners of several mining claims situated so as to require a common dumping ground or dam or other restraining works for the debris issuing therefrom in one or more sites may file a joint petition setting forth such facts in addition to the requirements of section nine hereof; and where the owner of a hydraulic mine or owners of several such mines have and use common dumping sites for impounding debris or as settling reservoirs, which sites are located below the mine of an applicant not entitled to use same, such fact shall also be stated in said petition. Thereupon the same proceeding shall be had as provided for herein.

Sec. 12. A notice specifying briefly the contents of said petition and fixing a time previous to which all proofs are to be submitted shall be published by said commission in some newspaper or newspapers of general circulation in the communities interested in the matter set forth therein. If published in a daily paper, such publication shall continue for at least ten days; if in a weekly paper, in at least three issues of the same. Pending publication thereof said commission, or a committee thereof, shall examine the mine and premises described in such petition. On or before the time so fixed all parties interested, either as petitioners or contestants, whether miners or agriculturists, may file affidavits, plans and maps in support of their respective claims. Further hearings, upon notice to all parties of record, may be granted by the commission when necessary.

The Commission also publishes the following suggestions, instructions and information for present guidance of those concerned. These instructions are subject to such modification as experience may suggest:

The petition must, in addition to fulfillment of the requirements of the law, contain, or be accompanied by, a full description covering the following points and by such maps as may be required for illustration of the question, namely:

The name, location and extent of the mining ground; the route of travel thereto; the river which the drainage of the mine reaches and the names of the tributaries which it follows; the height of the bank to be mined; the character of the gravel; the source of the water supply; the length, fall and dimensions of the ditch; the length of the mining season; the number of inches of water proposed to be used and under what pressure; the daily duration of mining proposed, whether for 24 or fewer hours; the fall of the sluice in 12 feet; dimensions of sluice and the amount of gravel to be handled in an hour; the character of restraining barriers existing or proposed; a description of the site for impounding detritus; its area and capacity; position and character proposed for the barrier.

Brevity and clearness are to be studied in these descriptions.

The above-stated information may be sufficient to enable the Commission, in some cases, to dispense with maps, but in all cases of importance maps of the mining ground and of the reservoir sites will probably be necessary, and in all cases will probably expedite the action of the Commission. The Commission prefers, for expedition, but does not at present insist, that each case should be presented by a mining or civil engineer capable of giving necessary information.

It will expedite matters if all the miners in one particular locality will prepare and present their petitions as near as possible at the same time, in order that the mine may all be examined during one visit of the Commission.

In cases of a joint petition contemplated in Section 11, there should be a separate statement from each individual mine as to its proposed output, amount of water, etc., the same as provided for a single petition.

All maps, plans, petitions or writings of any description on file in the office shall be open for examination by any interested party.

On a day following the date fixed in the advertisement, provided in Sec. 12, the Commission or a committee thereof will attend in its office to meet the petitioners and contestants, for the purpose of gaining by inquiry such explanation as may be necessary for a full understanding of the case.

The Commission does not invite oral addresses and prefers that all questions submitted for its consideration be presented in writing.

The office of the Commission is for the present established in room 89, Flood Building, San Francisco.

All communications should be addressed to Major W. H. Heuer, Corps of Engineers, room 89, Flood Building.

Interest.

TO THE EDITOR:—If I should build a system of political economy, I should class all legitimate payments of money as *wages of service*. Gifts, whether forced or voluntary, are not payments and need not be considered. Fines are the wages of the service rendered by the community in protecting the delinquent from punishment at the hands of the injured. Wages would be divided into direct and indirect, and the various subdivisions would readily fall into their appropriate places. The guiding idea would be that such inventions as business, money, capital, rent, interest, profit, insurance, property, etc., were made for men and not men for them, as the Nazarene said of the Sabbath, and those figments would not be exalted and personified as gods or demi-gods before whose imaginary claims the rights of men would sink into insignificance, and before whose spurious altars men must bow down and worship. I may write more on this matter at some future time.

But I must not prolong this letter, else I shall be voted as great a bore as a political economist. The matter is simple enough, if one will but be content to plod along on solid ground rather than seek to tread the clouds, and I wonder that so many gentlemen of learning and talent have labored so long and hard on their several failures to solve such "an easy one." But I suppose it must be because they are so great. The eagle, soaring in the bright sunshine, would stoop in vain on the tiny mosquito which the little bat can catch with ease in the darkest night; the humble, creeping tortoise nibbles the tender grass-blade, while the stately giraffe browses on tree-tops. "We never see clearly the ground we stand on," wrote a great author, and the taller we are, the more extended our horizon, the more easily we overlook the modest flower which we vainly seek in the distant view. But let us advance on the enemy!

Interest is money. Money (or service) is justly demanded only in return for service (or money) rendered; therefore, interest is justly demanded only for service rendered, and hence, if interest is just, it must be shown that the receiver has rendered service to him who pays it.*

Does the lender of money render the borrower a service in addition to that represented by the money lent, and if so, what is that service?

Let us take a concrete example: A man finds himself "a little short" on Saturday after banking hours, and he wants to go to the Sunday picnic. He pays a visit to our Uncle Harris and hands to that accommodating person his gold watch, which will be much safer in our uncle's possession than in his own pocket on a crowded ferry-boat. Our avuncular relative, after inspecting the bauble and scrutinizing the applicant, for the good man must be cautious in these matters, hands out a double eagle, which is quite enough for one to "blow in" on a Sunday picnic, and a check or ticket which will insure the return of the watch if presented, accompanied by \$21, on or before the expiration of a month from date. The one dollar extra is for interest. Why should our uncle demand it? Doubtless he takes care of the watch, but he would otherwise have to take care of his double eagle, which would be much the same.

But our uncle might use his money; he might lend it to some one else, or he might go to the Sunday picnic himself. Can we expect him to forego those advantages to accommodate that man for nothing? Certainly not. He cannot get even by using the watch, because he does not know at what moment the man may call for it; he must have it ready for delivery whenever it may suit the man to take it "out of soak." This is the argument of self-denial, and self-denial for the convenience of another is service rendered to that other. But suppose he does not need to use the money, nor care to go to the picnic, and has more watches than he can use; and admit that, if he takes care of the watch the man takes care of his money, or of an equal sum which he has in bank. Admit also that, if a twenty-to-day is worth more than the twenty to come when the man shall pay, so also a twenty on the day when the man does pay is worth more than the twenty which our uncle had a month before (that being "gone," as friend Aquinas says); yet we must consider that he has been sitting in his office many days, waiting for that man to come for the trifling accommodation; and then he has had to sit there a whole month longer waiting for the man to come for his watch, not daring to absent himself lest the man might have come sooner. Can we expect him to do all that, and pay rent for his office besides, for the fun of it? Hardly!

What, then, is the service which our uncle has rendered to that man? I answer, that of a purveyor. Just as your grocer purveys your sugar, which he has bought at wholesale and lets you have at times and in quantities to suit your convenience, so the pawnbroker has bought (earned) a quantity of money which he lets people have in such sums and at such times as they may choose. The only essential difference, which, however, does not affect the question before us, is that in the pawnbroker's case the transaction does not end with the purveyance of the money; he must again await the convenience of his customer to receive the money back and return the watch. I have somewhere read that "they also serve who only stand and wait." If any one is perverse enough to say, in order to say something, that the man had about as much trouble in going for the money, doing without his watch, and repaying the money, that perverting person must be made to perceive that the man did all that for his own accommodation. Moreover, he had the pleasure of going to the picnic.

There is the long-sought justification of interest in a nutshell, as it were, and it has been lying around loose for thousands of years. The pawnbroker has rendered service and "the laborer is worthy of his hire." Interest is just; it is the wage of service. On no other ground can it be justified, for money can be justly claimed only in return for service rendered.

*The claim of a child on its parents for service which it cannot return may appear to be an exception. I think this is a transferred or inherited claim and will not stop to discuss it.

The principle applies to all cases of interest (not to all rates, that is a question of amount of wage for the service). The "capitalist" or banker who lends on mortgage is only an evolved pawnbroker. A house and lot cannot be brought to him and locked in his safe, so he takes a deed of sale, with a proviso for resale on payment of debt and interest, and that is a mortgage. The client in this case has the advantage of using the pledge during the term. The lender renders service, firstly, by purveying money; secondly, by waiting for its return; the interest is the wage of that service, at least that part of the charge which is true economic interest. There are sometimes other elements which appear as interest, which I will now explain.

In considering this matter philosophically, as I am trying to do, it is necessary to discriminate. Apparent interest, the quantity which is paid under that name, is composed of three elements, as follows:

1st. True or economic interest. This is the wage of service of purveyance (trouble, work and expense involved).

2d. Profit (or plunder); of this anon.

3d. Insurance. This is the wage of the service rendered by him who assumes risk of loss for the accommodation of another. It is reduced to a minimum when the security is good, to zero when the security is perfect.

The second element is perhaps usually the greater in amount, at least when security is not very poor. It requires explanation, not because it affects the gist of our question, but because it is so interwoven with true interest as to appear to be a part of that. In fact all of the so-called elements of political economy are complex, the one overlapping the other or changing its character in the different stages of commercial operations, and I am convinced that the only way in which the student can avoid bewilderment and inconsistency is to keep constantly in mind the fundamental axiom that money can be justly claimed only in return for service, and its corollary that all just payments are the wages of some service.

That which, in trade, is called profit is not a simple quantity. When a man deals in a commodity and finds after paying all wages of production, carriage, and purveyance (his own part in the transaction), that he has still a balance in hand, he calls that profit. Many count profit before deducting their own wages, but that is incorrect. It is now in order to ask, if all wages of service have been paid, how is profit justified? I reply there is yet a wage of service which we have not counted, namely, the risk of trade by which the trader sometimes loses his own wage and sometimes more than that. Profit is a compensation of the risk of loss, the wage of the service of him who assumes a risk for the benefit of others, whether it be risk of fire, etc., of which he may be relieved by paying an insurance company, or of deterioration of goods, or of fluctuation of the market. Profit is therefore just.

Money, as I have said before, is, unfortunately, a commodity, and as such is subject to the usual effects of the ratio of supply and demand; hence profit is an element in apparent interest.

While the wage of service of any kind is just, whether it be called interest or profit or insurance or whatsoever, an exorbitant charge for such wage is *plunder* to the extent that it is exorbitant. Just what is a proper wage for any given service must be left to the individuals concerned to decide. There is no standard for that; but when a man takes a mean advantage of circumstances which no man can control, he is unjust, and still more so when he, alone or in association, purposely brings about the circumstances which enable him or them to oppress their fellows. These things are done, more or less, in all kinds of business.

Interest is just—that is fair interest, fair wages for service rendered. That injustice often arises from it only places it in the same category with other human affairs. True, the Shylock often takes advantage of circumstances, and exacts his pound of flesh with relentless rigor, careless though blood may flow; but it is not the man who does so. Oh, no! it is the priest of the Temple of the god Business, the prime canon of whose cult is to get the greatest possible amount of service in return for the least possible, to charge "all the traffic will bear." The money-lender is even as others are.

That some men are able to live on the interest of their money, while not rendering service equivalent to that which they receive, is in fact a gross injustice. It is due, however, not to any inherent injustice of interest, but to defects in our social condition by which it becomes possible for some to "make" enormous wages for relatively small service, and so to accumulate fortunes far beyond their deserts—in short, to plunder their fellows, and the wrong is perpetuated by our laws of bequest and inheritance, which require thorough revision.

It is this state of affairs which leads to that great misfortune, a bonded national debt, which lays a burden on generations unborn and robs those who have nothing but a wickedly curtailed right to toil, of a part of the product of their toil. The child is born into a land in which is no place for the sole of his foot except he buys it by toiling for others and, as if that were not already too much, he must toil yet more to pay the interest of debts which he did not contract, and many of which were contracted on Shylock terms, without good reason, and from which he derives no benefit.

One cause of scarcity of money at certain times and, consequently, of high interest, is the practice of hoarding, and it is one advantage of paper money that it is less liable than metal money to be thus withheld from performing the function for which it was created by the community. I cannot say if it would be practicable to make hoarding of money a crime in law, but it is certainly wrong. The money substance may belong to the holder of it, but the money quality does not. Those who want to hoard should buy some kind of imperishable property, such as bullion or diamonds, and let the money circulate.

The vindication of true interest is not a great achievement. The populace, in all times and all countries, have intuitively recognized its justice. It is the manifest injustice perpetrated in the guise of interest, the element of

plunder arising from the commodity quality of money, the abuse of the power given by circumstances, the artificial production of conditions for the exercise of that power, and the uncharity of interest, especially high interest, on money or goods borrowed for personal needs, that have caused distrust in thinkers both lay and clerical.

I have always had a strong suspicion that a general and enduring popular belief contains a kernel of truth. Women, children and the masses often feel truths which learned men will not feel and cannot see. C. H. AARON.

Mining Notes from Siskiyou.

TO THE EDITOR:—Owing to the bountiful supply of water this last winter, the placer miners throughout this county are doing well this season and some rich clean-ups are expected. Austin & Raynes are pushing work on their blue gravel drift mine on the mouth of Greenhorn creek. Their shaft is 107 feet to bedrock and, although they have run one drift 105 feet south from the shaft, they have not succeeded in crossing the channel yet. They have been running two shifts now for several months, night and day, developing the mine, and it has paid a dividend from the beginning, which speaks well for the future of the property. Two drifts have been run from the shaft, one 85 and the other 105 feet, each 12 foot face, which will give ample working room when they commence breasting out. The pump formerly used, being too small to handle the water, is now being replaced by a larger one of sufficient capacity to keep the mine dry. They will have the new pump in place in a few days; then work will be resumed and a double force of men will be put to work to open up the mine as soon as possible. The channel where the mine is located is very wide and the old miners, who claim to know, say it is immensely rich.

About a quarter of a mile west of this mine, on the same channel, C. L. Murray & Co. are sinking a shaft to tap the pay gravel. They reached the depth of 56 feet, where the water drove them out, and they suspended work until they can get the proper machinery in place to handle the water. It is known, by shafts which have been sunk on this ground in years past, that bedrock is not near so deep as it is at the Austin & Raynes mine. Mr. Murray expects to reach bedrock at the depth of 60 or 65 feet.

There are some very promising looking quartz prospects on the divide between Greenhorn and Cherry creeks and the ore from them assays very well. The ledges are small but well defined and have the appearance of being permanent. Several mining men have visited this locality of late, but so far no recent transfers of mining property are reported. ALEX. QUARTZ.

Yreka, June 6th.

The World's Petroleum Supply.

Petroleum is produced in various countries, either in its raw state springing from natural sources—as, for example, in the United States, Russia, Canada, Dutch East Indies, Austria, Roumania, Peru, Argentine Republic and Ecuador—or produced by the distillation of bituminous schist, as in Italy and France. Up to the present the United States has been the most important center of the petroleum production. The *Moniteur Des Interets Matériels* says that the statistics establishing the yield during the last months of 1892 seem to indicate a gradual exhaustion of the sources, as the average monthly supply in 1892 was only 87,711 gallons, compared with 94,980 gallons in 1891. On the other hand, the production of raw petroleum in 1891 and 1890 was respectively 34,000,000 and 45,000,000 barrels, or a falling off of 11,000,000 barrels in 1891. In spite of this the exports of petroleum, raw and refined, have followed, thanks to the employment of tank steamers, an ascending scale, and amounted to 740,905,237 gallons in 1892, as compared with 667,000,000 in 1891.

In spite of the diminished production, the prices, instead of rising, have experienced a fall owing to the keen competition of Russian with American petroleum, hence the abandonment of certain springs in the United States.

At Baku, in Russia, the production is very great, and even exceeds the demand. No greater proof of this fact can be evinced than the low prices lately quoted, viz., one-half copeck per pound (36 pounds avoirdupois) for raw petroleum, and 7 copecks free on railway trucks for refined petroleum. During the first nine months of 1892 the production of raw petroleum in the Apsheron Peninsula amounted to 213,560,157 pounds, as compared with 213,056,000 pounds for the corresponding period of 1891.

The present depressed condition of the petroleum market in Russia will be improved, it is expected, by the formation of the syndicate that has been constituted by the seven principal producers of petroleum at Baku under the presidency of M. M. Nobel freres.

With respect to petroleum production at Baku, Mr. P. Stevens, Her Majesty's consul at Batoum, in a report to the Foreign Office, dated the 1st of March, states that an oil well has recently commenced to flow at Baku, which, at its present rate of production, considerably exceeds the daily output of all the largest wells that have hitherto been in activity in the Apsheron Peninsula.

It is estimated that the well in question is delivering, as near as possible, 1,000,000 pounds, or 17,742 tons of crude oil a day, but owing to the almost insurmountable difficulties experienced in getting a flow of this magnitude under control, most of the oil is running to waste into an adjoining lake known by the name of Romani.

The well is situated one-fourth to one-half mile farther eastward on the peninsula than any of the other wells, and, it would appear, opens up a fresh territory comprising several hundred acres of land from which no oil has yet been extracted.

From the point of view of the importance of the production, the petroleum supplies of Canada take the third place. From the 1st of January to the 30th of November, 1891, 192,700 barrels of raw petroleum and 248,025

barrels of refined were exported. During the same period of 1892 these shipments amounted to 182,371 and 279,823 barrels respectively, a total production in the first 11 months of 1891 equivalent to 805,687 barrels of raw petroleum, and in 1892 to 917,561 barrels. Petroleum has been found in Quebec, Nova Scotia and New Brunswick, and particularly in the Northwest Territories, where it seems certain that there is an immense unexplored oil region. It is, however, in the county of Lambton, whence most of the oil has been, and still is, obtained. The township of Enniskillen is one of the largest oil-producing districts, and the oil is obtained there at a depth of from 370 to 500 feet. The first flowing well was struck in February, 1862, and before October of the same year there were no less than 35 wells. As there was no accommodation for the storage of this enormous flow, there was a frightful amount of waste, and it is calculated by one authority that between the dates mentioned no less than 5,000,000 barrels of oil floated off upon the water of a neighboring creek.

The petroleum supplies of the island of Sumatra have only recently been exploited. The product of one district amounted to 20,000 ten-gallon boxes in a year. According to the most recent analyses (*vide C. T. J.*, No. 306, p. 210) the Langkat petroleum is of excellent quality, and moreover they are derived from lands the extent of which is 40 times greater than those in Russia.

According to official statistics, published by the Austrian Minister of Agriculture, there were in Galicia, in the year 1891, 199 establishments engaged in the production of petroleum, and 79 ozokerite mines, supplying together a total quantity of 93,875 tons, of an estimated value of £491,000.

In Italy and France petroleum is obtained by the distillation of bituminous schist. In 1891 the Italian production was 1155 tons of petroleum, while in France the amount of the product for 1889 was 194,000, as compared with 174,000 in 1888.

The yield in Roumania barely attains a value of £2400, although this amount might easily be increased, seeing that there are vast numbers of beds from which it can be obtained, and that the oil itself is of excellent quality. The explanation of the small supply lies in the fact that the government insists, in the case of crown lands, upon the payment of a royalty immediately upon the signing of the contract, and even before any petroleum has been found.

The petroleum beds in Peru are of vast extent and are beginning to attain considerable importance. The London and Pacific Petroleum Co. has works extending over a distance of two miles along the coast, and owns 26 pits which are in working, having a depth of from 70 to 500 feet, and producing 900 barrels a day.

In the Argentine Republic, 12 pits have been sunk in the department of Lujan, province of Mendoza, of which three have yielded excellent results. The company working these mines since 1890 has produced about 1500 tons of petroleum.

At Cachenta, in the province of Mendoza, in the Argentine, a considerable petroleum industry has sprung up during the last two years. In this district there is a promise of great mineral wealth, but as yet it has been worked only in a desultory manner. There seems to be a future before the petroleum industry. Up to the present time three successful borings have been made, and the total output since the first boring, in April, 1890, has been 1500 tons. The oil is conducted through pipes to the storage tanks at San Vincente. It finds a ready sale at the Rio Cuarto and Mendoza gas works and at the Argentine Great Western railroad. This railroad has 12 locomotives which use the oil as fuel.

In the republic of Ecuador numerous petroleum beds are known to exist, and these are of considerable extent. In certain places the oil springs from the ground and forms pools and streams, which eventually find their way into the sea. A syndicate has recently been formed with the object of obtaining the concession of these sources of petroleum, the product of which is said to be of a very good quality.

In British Burma it appears that there are now 602 petroleum wells, an increase of 92 since 1888, but there are distinct signs of exhaustion. The fact that the aggregate production of the richer wells has fallen off, while that of the poorer ones has increased, although many new wells have been opened, is regarded as the surest indication of the approaching decline in the industry. The drilled wells worked by the Burma Oil Co. and the Burma Oil Syndicate have given very satisfactory results. In 1890 the total out-turn amounted to over 3,670,000 viss; but the rate of progress during 1888, 1889 and 1890 has not been maintained during the past two years. The history of the industry shows that the production of the oil-field steadily increased from the beginning of the century until about 1873, when it began to decline, rising again in 1885 and coming practically to a standstill in 1891.

The Cause of Ore Chutes.

For years I, like probably many others, have pondered over the peculiar distribution of ore in the limestone contact mines of the Rocky mountains, and particularly as exhibited at Leadville, Red Cliff and other mining sections of Colorado. Why are the deposits in distinct chutes or channels, and what cause gave these chutes the trends or courses they have? These are questions that must have occurred to every mining man, and doubtless were dismissed by the majority without any solution to the question. Certainly these questions intruded themselves upon the mind of the writer hundreds of times before an apparently satisfactory answer was evolved.

In examining ore chutes occupying planes between blue and brown lime, or blue limestone and shale or porphyry, it will be noticed that, while the ore chutes seemingly occupy troughs or channels in the bedding rock, these are not depressions or waves in the formation, but arbitrary replacements of the limestone. The hanging-wall or cap is invariably regular, and does not conform with the bedding plane of the ore, neither does it separate or distend over the ore, so as to have produced an opening in what was

originally a closed contact, and might thus have been thought to have facilitated the creation of an ore chute.

Another feature about ore chutes that has led me to considerable speculation is that they are invariably thicker on one side than on the other. In other words, the swelling or thickest part of the chute is nearer to one edge than the other. Thus at Robinson and other places I have found that an easterly and westerly ore chute, 150 feet long, would reach its maximum thickness at 20 to 30 feet from the southern edge, thinning gradually to the northward until it feathered out entirely.

The course of ore chutes differs in different districts. At Leadville they have a general northeast course; at Rico they run southeast. In all districts they are more or less parallel—that is, when a chute is considered relative to its neighbor, although the same may not prevail as to an entire system, as at Leadville where there are probably no less than 30 distinct ore chutes or channels. In the northern portion of this district the course of these channels is, if anything, a trifle south of east. The great ore chute that traverses the Morning Star and Maid of Erin mines has a course as nearly east and west as a line can be drawn, the Iron Hill ore chutes have a course north about 50° east, while farther southward, the Rock Hill chutes show a trend north, 20° east only. If continued, they would all unite at no very distant point. This, however, is not at all probable.

Whatever the theory as to the genesis of the ore of the different mining districts, there is no question but that the ore was deposited from mineral-charged waters, which found an opening and opportunity to circulate in the contact plane. If there were originally no troughs or depressions in the limestone, it would seem that the contact plane generally should have been mineralized, instead of channels. In fact, whether the flow was induced by gravity, hydrostatic pressure, capillary attraction or any other agency, the facilities for mineralizing one portion of the contact plane were as good as for another. Following on this line of reasoning, and not wishing to enter the more complex field of speculation involving the agency of electric currents, etc., a cause for the deposition of the ore in channels was sought in the character of the limestone itself. It then occurred to me that in the deposition of the limestone, certain belts or zones incorporated more organic matter than others. What the movements were of the paleozoic sea, and the extent of its animal and vegetable life is a matter of speculation, but it is easy enough to imagine aggregation of organic matter in lines conforming with the ebb and flow of the tide, or possibly the successive lowering, or alternate lowering and rising of the sea. Such concentrations are now represented by ore chutes. It is to such an origin of the ore chutes also that an explanation can be found to the unequal thickness of the chutes, and to their strength along an axis parallel with the ancient shore lines.

The Leadville district, during the carboniferous age, doubtless was a bay of the Paleozoic sea, with Mount Massive on the west and Homestake and others more northerly. This gave, in the northern part of the district, a high tide line nearly east and west, and more southerly, a tide line north and south to conform with the base of Mount Massive and Elbert, which is with the meridian.

If the proposition of an unequal distribution of organic matter in the limestone is tenable, then we have no difficulty in solving the question why ore is deposited in chutes, for the minerals in solution as sulphates would find ready reception upon coming in contact with carbonaceous matter.

I am further confirmed in this belief of the cause of ore chutes by the character of the ore yielded by different chutes, which varies greatly. Some are rich in lead, but have very little iron associated with them; others are highly ferruginous, but devoid of lead. The Silver Cord and the Florence and Little Ella ore chutes contain considerable gold—one in the extreme north, the other in the central and the Florence in the southern portion of the district. Twenty or thirty ore chutes between these are devoid of gold. There is no doubt but that the same mineralizing agency that produced one of the ore chutes produced all of them, but that the re-agents necessary to transfix the mineral in solution were not equally and proportionately present in the different channels in the limestone, hence the variation in the composition of the ores of different chutes, although the same are within but a few hundred feet of one another.

My theory on this proposition I believe is further verified by the almost unlimited area in the west, where limestones and eruptive rocks come in contact under conditions not unlike those of Leadville and elsewhere, and that have unquestionably been subjected to mineralizing influences, but not possessing the necessary re-agents, retaining none of outflowing wealth.

This latter proposition is, in a measure, exemplified in the barren belt of Southern Carbonate Hill, over a third of a mile wide, and, with strong ore chutes on either side, and practically the same causes and effects noticeable at Leadville, prevailed with slight modifications in all the other sections of the west.—A. F. Wuensch in Mining Industry and Tradesman.

THE NEW YORK *Sun* prints a complete and very interesting review of the wheat situation throughout the world. It points out that Europe's requirements are each year about 14,000,000 bushels greater than the year before, on account of the increase in population. Wheat production in Europe is decreasing, and the present year's requirement of 368,000,000 bushels, or a little over a million bushels per day, will probably be less than what will be needed for years to come. The *Sun* says, that with a liberal estimate India may furnish 40,000,000 bushels. If our crop yields 450,000,000 bushels we may be able to spare, with the surplus of 1892, as much as 126,000,000 bushels. On the most favorable showing there must be a deficiency of 64,000,000 bushels, and then leave no reserves to be carried over to 1894. The *Sun* has a reputation for accuracy and reliability in these annual reviews, and we may accept its statement of the situation as substantially correct.

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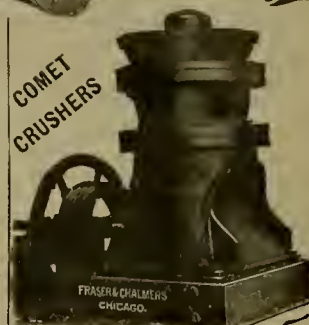
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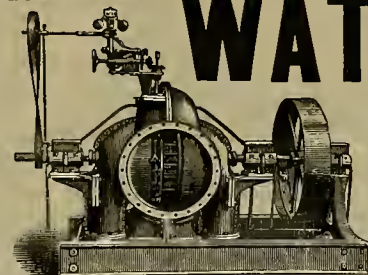
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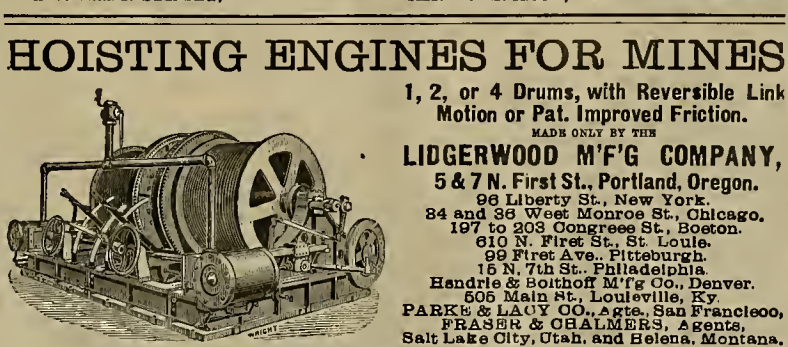
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Mechanical Progress.

Armor Plates Pass the Premium Test.

Another highly successful trial of armor plate for the navy took place at the Indian Head proving grounds on May 11th. The plate tested is intended for the *Amphitrite*, and represents a group of about 1000 tons of armor of the same general class and thickness, for which the government is to pay \$510 a ton. The plate was of nickel steel, nine inches thick, made at the Carnegie Works. The trials were made for the acceptance and premium tests. The plate was fired at by an eight-inch-high power rifle gun. Two shots were fired. Both projectiles were of the armor-piercing type and weighed 250 pounds each. In the first round, 61 pounds of powder were used, the velocity being 1391 foot seconds. The plate and about one inch of the backing were cracked, but no similar damage was done to the plate. In the second round 85 pounds of powder were used, the velocity of the projectile being increased to 1672 foot seconds. The shot went through the plate, and partly showed through the backing, but did not get through the latter. No signs of a crack in the plate were visible after the firing, the holes made by the projectiles being clean cut, with only the usual fringes on the face. Altogether, the trials were highly successful.

The *Amphitrite's* plate has the record of being the first one which has passed the premium tests. Under the terms of the contract the manufacturers are entitled to extra compensation at the rate of \$30 a ton for ballistic properties of all armor in this group. It happens, however, that the Carnegie Company will not receive a premium in this particular case, as the premium will, under the regulations of the Navy Department, be used to defray the expenses of experiments with this and other plates recently tested. American Manufacturer.

CURBING SHAFTS AND WELLS.—A new method of lining and curbing shafts and wells is now being tried in Germany, says *Engineering*. In this, blocks of molded concrete are employed, which form segments of a circle or an oval, varying in size according to the dimensions of the shaft or well, and weighing from 8 cwt. to 12 cwt. each. These blocks have at each side a round fluting, with a channel at the top, and a corresponding but smaller semi-cylindrical roll or beading at the bottom; they have also two drill holes, one running vertically and centrally, and the other horizontally from back to front at the base. The vertical drill hole enables a rod with a hook or ring to pass down and be intersected by a bolt running through the horizontal drill hole, thus holding the rod and supplying the means of hoisting or lowering the blocks into their places. When a complete round of segments is formed (the blocks break joint like ordinary brickwork), the vertical flutings are rammed with a cementing material, and the space between the round and the natural wall of the shaft is packed with concrete. Before laying the next round of blocks, a thin layer of cement is placed in the channel on the top of the blocks beneath, into which the projection of the upper blocks fits, the joints thus becoming perfectly tight, and forming a solid lining through which water cannot penetrate. This system, it is said, has already proved a success in several colliery shafts in the Saarbrocken district, belonging to the Prussian Government, which have been provided with linings in the manner described, with satisfactory results.

THE IRON BUSINESS.—Iron and iron products of all kinds continue to sell at extremely low prices. Beyond a doubt the point has now been reached beyond which values cannot be depressed without entailing disaster. Never in the history of the world have iron and steel been so low in price as at present, and still the tendency is downward. The phrase "Bedrock has been reached," although stereotyped in most offices, has become worn by long usage and no longer means anything, except that the writer knows nothing about the matter. It is certain that a good many concerns in this country are engaged in manufacturing iron and steel at an absolute loss. It is in business as in nature—the fittest survive. Not that those best entitled to success succeed, but those best fitted to carry on business. Improved machinery has had more than anything else to do with the present low prices of iron, steel and their products. Only wealthy concerns can adopt all the latest and best labor-saving devices, and, in consequence, the small manufacturers will be the first to succumb. Besides this, some plants are better located to economically

manufacture than others. In the meantime strikes for higher wages are out of place.—Chicago Journal of Commerce.

COPPER-PLATING SHIPS' BOTTOMS.—James D. Darling, of Frankfort, Philadelphia, has been developing a method of electroplating the hulls of steel vessels with copper to keep them from fouling and to do away with the necessity for dry-docking, scraping and repainting. He proposes to plate the bottom of iron and steel ships with a continuous sheet of copper that will be so firmly attached to the iron or steel that there will be no danger of its being torn off by accidental grounding on bars, etc., and that it will have no seams or joints to admit sea water and set up galvanic action. The usual method of depositing copper electrically on iron or steel could not be used for this purpose, because the thick coat of copper required when thrown down from the ordinary sulphate solution would be very rough and uneven on the surface, more or less porous and entirely unfitted for the purpose. Mr. Darling has discovered a new method of depositing copper by which a perfectly smooth surface is obtained and by which a very dense and firm deposit is made. The White Star Steamship Company has been investigating it with a view to using it on their new ships, and it has also been submitted to the United States Navy. Arrangements are now being made to plate a small vessel, so that a practical trial may be given to the invention.—Iron Age.

FUEL OIL ON AN OCEAN STEAMER.—Last week we made a brief mention of the arrival of the James Brand, a tank steamer, from across the Atlantic, having made a successful experiment of using oil as a fuel. The captain of the vessel reports that for three days the Brand used oil for fuel, and the manner in which it worked gives conclusive evidence that it will be a complete success. The manner in which the fuel is fed to the boilers is by jets of steam and fuel petroleum which meet under a line of brickwork below the boilers. Sufficient heat can in this manner be generated to force everything to a white heat, while the temperature can be regulated by the engineers according to the speed required. This is the first attempt of a vessel to cross the Atlantic by generating steam with oil as fuel instead of coal, and the result may be very far-reaching, especially as the Brand is not an experiment but a regular cargo carrier—in fact one of the largest, the carrying capacity being 1,500,000 gallons. The vessel registers 3780 net tons, and is built of steel throughout. Her length is 345 feet over all, 43½ feet beam, and 29½ feet depth of hold, with triple expansion engines of the latest and most approved type, and Scotch steel corrugated boilers.—American Manufacturer.

WIDE WAGON TIRES.—It is only a question of time when broad wagon-tires will be seen on all our wagons employed for hauling merchandise and freight, the same as may be seen in all the capitals of Europe. The Ontario Department of Agriculture has sent out a valuable special report, or bulletin, setting forth the treatment necessary to make, as well as to maintain, good roads. The report says the repairing of roads once a year (the usual plan) is wrong in principle. It is all the more objectionable, as almost always it is done in the spring, the good effects disappearing before the time for fall and winter travel sets in. The report strongly commends the movement in favor of wide tires for draft vehicles. It says it has been proved by repeated experiments that wheels with tires two and one-half inches wide cause double the wear of wheels which have four and one-half-inch tires. The wide tire has a tendency to roll the roadbed and keep it smooth at the same time, while the narrow one cuts it up and requires more hauling force for the same weight of load, besides spoiling the thoroughfare. Most of the European countries have laws regulating this matter.—Horseshoer and Hardware Journal.

W. K. VANDERBILT'S new yacht "Valiant," which is to replace the sunken "Alva," was launched at Birkenhead, near Liverpool, last week. She has been built by Laird Bros. and is a steel twin-screw vessel of 2400 tons. The principal dimensions are: Length between perpendiculars, 310 feet; beam, 39 feet; depth, 25 feet 6 inches. She will have two sets of triple-expansion engines driving manganese bronze screws. The horse-power to be developed will be 4500, which will insure, with moderate forced draft, a speed of 17 knots, while under natural draft the vessel will steam 15 knots. The "Valiant" will be fitted with all modern improvements, including the electric light and two powerful search lights.

Scientific Progress.

Lasting Character of Soil Pollution.

Dr. Lauciani, in his work on ancient Rome, says that while a system of garbage collection existed under Roman rule, the disposal of refuse was as crude as it is in many modern towns and cities. That this disposal method was regarded as a nuisance at a very early period is made evident by the fact that sanitary laws were passed 2000 years ago that were intended to at least mitigate the trouble.

Some of these laws, graven on stone, were unearthed by Dr. Lauciani in his excavations, and the text of one of them reads, "C. Centius, son of Caius the Praetor, by order of the Senate, has set up this line of terminal stones to mark the extent of ground that must be kept absolutely free from dirt, and from carcasses, and from corpses. Here also the burning of corpses is strictly forbidden." On the bottom of this stone, in red letters, some probably near resident had written, "Do carry the dirt a little farther; otherwise you will be fined."

But this bounding line, beyond which any foul matter might be cast to putrify under a Roman sun, was only 400 feet from the city walls, as erected by Servius Tullius. When Dr. Lauciani dug up these stones, on June 25, 1884, and about 2000 years after the use of this area for refuse disposal, the soil was still so polluted and the stench arising from it so horrible that even his workmen, inured to such work as they were, found it absolutely unbearable and had to be relieved at frequent intervals.

The dumping-ground near the Esquiline cemetery, including the present cemetery itself, was the greatest of these nuisances, and so long ago as the beginning of our Christian era the Roman rulers found it necessary to cover this area with 25 feet of soil and to convert it into a garden.

The long and active survival of disease germs in soil was also claimed in excavations made inside a cofferdam uncovering the bed of the Tiber alongside the bridge leading to the Castle of St. Angelo, in Rome. Here, in successive strata, were found coin and other relics, fixing the age of the deposit down to the fourth century A. D. The soil as it was slowly removed was piled upon an adjoining wharf and then taken away. When the very lowest and oldest of all the strata disturbed was so disposed of, an epidemic of typhoid fever broke out among the workmen and those living in the immediate vicinity. The result of careful examination is said to have shown that the trouble came from this lowest strata, and that disease germs that had been lying dormant at the bottom of the Tiber for nearly 1500 years were still active for evil and proved their vitality. This statement, as far as the survival of the germs of typhoid is concerned, has been disputed. Considering the difficulty of detecting these germs in refuse recently deposited, there is ample room for doubt as to the exact point in the strata that caused the trouble observed.—Engineering News.

Spots on the Sun.

Henry M. Parkhurst has sent the following to the *Herald*: "The large group of spots referred to in the telegram of Professor Holden last Friday, is now passing off the western limb, but it is so vast in extent that a portion of it will be visible several days. The visibility of the spots to the naked eye, reported by Professor Holden, is not due to the size of any individual spots, but to the large number in a cluster, surrounded by the penumbra.

"Dr. Dick, after many years' observation of solar spots, came to the conclusion that a single spot in order to be visible to the naked eye must be at least 50,000 miles in diameter, or six times the diameter of the earth. The principal cluster in this group is very much larger than that, and it is not improbable that it will continue long enough to pass around the disk and reappear in a little more than two weeks on the eastern edge.

"The largest single spot now visible is a little northwest of the center of the sun. It can be seen with a good opera glass with the eye suitably protected. There are also other spots along the line of the sun spots, the largest of which is one which has appeared at the eastern edge since the telegram of Professor Holden. If the theory is correct, that it is the spots at the eastern limb of the sun which most affect the earth's meteorological condition, it would seem that it is to this spot, rather than to Professor Holden's group, that the present hot wave is due.

"The whole surface of the sun seems to

be unusually active, even for the maximum of solar activity, and Dr. Veeder will have ample opportunity to compare results with the conditions of an exceptional season."

Luminous Discharges in Electrodeless Vacuum Tubes.

An abstract of a paper by Mr. Rimington, read before the Physical Society, is given in the *London Electrician*, May 5th, accompanied by a few illustrations. He states that luminous rings produced in vacuum tubes by discharging Leyden jars through coils surrounding them had been attributed by Tesla to the electrostatic action of the surrounding wire, rather than to the varying magnetic induction through the rarefied gases. The present author thinks that the latter cause is the chief one, but that a supposed electrostatic field greatly assists their production.

An experiment was shown in which a tube was placed in a coil through which Leyden jars were discharged, the spark gap being adjusted to produce no luminosity. If, then, the terminals of the coil—that is, the Leyden jars—are also connected to one or both of two metal plates between which the coil is placed, in such a way as to increase the electrostatic field through the bulb, bright rings immediately appeared. In another experiment two loops of wire in series were used and were put on the bulb in such a way as to produce a large magnetic effect, but a small electrostatic field. Bright rings appeared, while, if the magnetic effects opposed each other and the electrostatic field was increased, no rings were seen. The original paper treats this subject mathematically at some length; he shows that the time integral is roughly proportional to the fourth root of the capacity; large jars are therefore only slightly better than small ones. Mr. Trotter discussed the difference between these effects and those obtained by Swinton. The latter, Mr. Rimington said, were quite different and were due to different causes, namely, to the phosphorescence of the glass.

MOISSAN'S DISCOVERIES.—The name of Henri Moissan has figured very prominently in the scientific world for some time, and not without reason, for the distinguished young French savant has lately made a series of experiments and discoveries whose interest is only equalled by the rapidity with which they have been successively placed before the public through the medium of the celebrated Paris Academie des Sciences. On February 6th Mons. Moissan read a paper, according to which, he claims, by means of the electrical furnace capable of generating the extraordinarily high temperature of 300 degrees Cent. that he lately invented, to be able to manufacture the diamond. On February 13th he contributed one memorandum upon a Canon Diabli diamondiferous meteorite, and another upon the presence of graphite, carbonado and microscopic diamonds in the blue earth of Cape Colony, while on February 20th he utilized the furnace mentioned for the purpose of obtaining, within ten minutes, an ingot of the rare metal uranium weighing 250 grammes. Upon this occasion he pointed out that he had ascertained that a combination of this metal with carbon ignites spontaneously in the atmosphere, yielding a white light; and, by way of practical illustration, he, much to the alarm of his select audience, slyly shook a bottle containing a preparation of this class, with the result that a slight explosion followed. When the assembly was once more prepared to calmly listen to Mons. Moissan that gentleman exhibited ingots of chrome and manganese prepared in a few minutes in the way the uranium bar had been, whereas the ordinary reduction process, he observed, absorbed a comparatively long time. All things considered, the French scientist believes that the use of higher temperatures, which can be developed by a dynamo-electric machine actuated by natural water power, will become an important feature of the art of metallurgy.—The Age of Steel.

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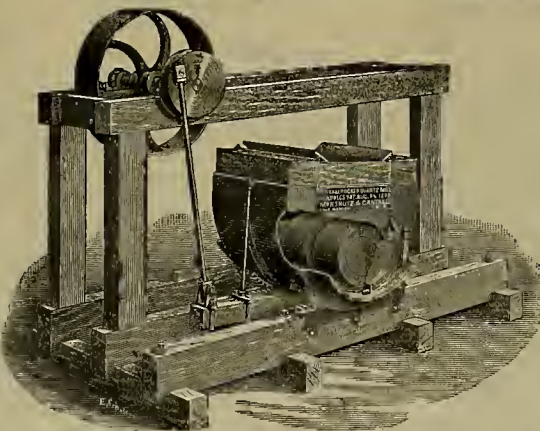
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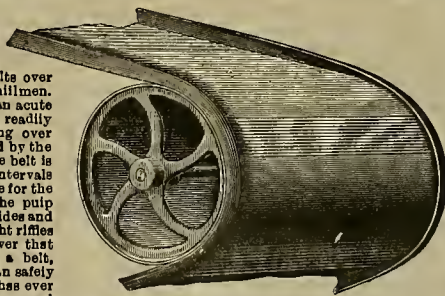
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Useful Information.

The De La Bastie Method of Hardening Glassware.

The recent expiration of the patent covering the De La Bastie process for hardening and tempering glass will perhaps justify a reminiscence of the interest that was excited by the invention at the time of its first announcement, says the *American Manufacturer*. In 1874 there appeared in several German journals an account of a new method of hardening and tempering glass, the invention of Mons. A. De La Bastie, of Richmond, France. The account went on to describe the properties of this glass as sufficiently remarkable to justify the belief that a complete revolution in the industry was to be expected and glass was no longer to be synonymous with brittleness. No such marvelous results have been attained, but the process has some features which have kept it alive up to this date, and now that the barrier of this patent law has been removed, will doubtless lead to its further introduction in certain branches of the trade. The early tests of the samples which had been subjected to the treatment discovered by M. De La Bastie were such as would seem to justify the extravagant promises made for it at the time. The tests were made before a committee of three, delegated by the "Society of Glass Industry" of Germany, and afterward repeated before a meeting of the society. A comparative test, in which a sheet of ordinary glass about 5x8 inches in size and one-eighth inch thick, supported in a horizontal position in a loose wooden frame, was repeatedly broken by a leaden weight falling from a height of 20 inches, showed in a remarkable way the superior strength of the prepared glass, of which a similar sheet, similarly placed, withstood the blow of the weight falling from a height of more than 14 feet and broke only after repeated trials. Watch glasses of the "elastic" glass, as it was then called, were thrown up to the ceiling of the room, which was 14 feet high, and allowed to fall on the wooden floor, remaining unbroken through several repetitions of this same test. The articles when thrown to the floor vibrated as though made of metal, and rang with a distinctly metallic tone, but when finally broken, they flew into a thousand pieces. The same remarkable qualities were displayed by the articles when subjected to severe changes of temperature. Samples were heated to a low red heat, and were plunged into cold water without cracking them. The effect of these tests on the society before which they were made was that they at once entered into negotiations for the purchase of the patent for Germany. These negotiations were, however, broken off by the appearance of several other inventors, all of whom claimed to have discovered a process that would produce the same result.

The method employed by M. De La Bastie, as far as is known, consists in the sudden immersion of the article to be hardened, while heated to redness, in a bath consisting of oil, resin, and other similar substances, heated to about 570° F., and thus allowing the bath and the objects to be tempered to cool slowly together. The bottom of the vessel containing the heated bath is covered with a layer of sand, or a wire netting is stretched above it, to guard against breakage of the ware as it is plunged in, or the dipping is done by means of a wire tray filled with ware, the whole being immersed and withdrawn when the process is finished. The original glass, as made by De La Bastie, was of ordinary composition, being a soft alkaline glass containing 68 per cent silica, 10 per cent lime, 17 per cent alkali, 2 per cent alumina, and 3 per cent coloring matter. The specific gravity was 2.52, this latter property, it was understood, being somewhat increased by the hardening process. The principal difficulties encountered in the production of glassware by this process seem to have arisen from the behavior of the glass when immersed in the bath, and the difficulty in cutting or working the finished product. The first of these difficulties has led to the gradual abandonment of the manufacture of all articles whose shape does not permit of their being immersed in such a way that the liquid shall reach both sides at once, and which show marked irregularities in thickness. The second objection has resulted in shutting off of the manufacture of window or sheet glass by this method, since the finished product could not be cut into suitable sizes by any practical method, the diamond having no effect upon its surface. The only articles made to any extent by this process in this country are lamp chimneys, the peculiar shape of which is specially adapted to the requirements. The factory of E. D. La Chapelle & Co., in Ottawa,

Ill., has been engaged in this branch for some years, and is doing a good business. Their success in this line would go to show that the process can be made profitable under certain conditions, and now that the method is free to all, we may look for a further extension in its application. In the as yet undeveloped chemical ware branch, in the manufacture of glass tubing, and in the production of a window and mirror glass that is invulnerable to the ordinary misfortunes of its kind, we may still look for the previously enumerated difficulties to be overcome and an improvement in their intrinsic value to be made.

Diphtheria.

Concerning the management of a case of diphtheria, so far as that may fall within the domain of the parents, the following few rules, while not incorporating all, are still the most important for preventing the spread of this dreadful disease, and my earnest advice to every mother is to study them carefully, and preserve them for future reference.

First, strips of linen or cotton fabric, about eight inches wide, folded several times, and long enough to reach from ear to ear, should be wrung out of ice water (if in winter) and if in summer put directly upon ice, and then applied externally to the throat, and as fast as one cloth gets warm another should be ready to take its place. If the child complains of being cold, its feet and hands should be bathed in as hot water as it can stand. When the child is very young, it may be readily ascertained if it be cold or not by feeling its hands and head. Under no circumstances should hot applications be made to the throat. If the child is old enough it may be given broken ice to suck constantly, even if the water is spit out. The cold applications inhibit the growth of the microbes. The patient's hands should be washed frequently—and here let me say so should those of attendants—and the vessel used for the purpose should not be used for any one else. The patient's clothing needs protection in front. This may be done by pinning back of the neck a large piece of linen or cotton fabric, which will cover the whole front of the child and reach as far as the knees. A material should be used which can easily be boiled or burned when soiled. The little patient, if old enough, will want to spit, and for a spittoon a small wooden box with an inch of sawdust on the bottom is capital. Fresh sawdust should be supplied at least once a day—three times a day would be better—and that which has been used should be emptied upon a good, hot fire, and thus burned at the time the change is made. If there are any flies about, the box should be kept covered, and, as a matter of course, only uncovered when the patient desires to spit; otherwise, the flies alighting upon the spittle would carry the germs of the disease with them, and then alighting upon the family's food and drink, necessarily infect them, and thus indirectly infect the whole family. This is by no means chimerical, but a well-established fact.

All clothing and bed clothing that come in contact with a diphtheria patient contain the germs of the disease. For this reason all such clothing should be disinfected, and aired or washed before it is used again.

What is said of diphtheria is also true of scarlet fever and measles. The contagion of these diseases is in proportion to the severity of the case from which it comes. The less care given to ventilation and general cleanliness, the more active does the contagion become; but the contagion from a very mild case may cause very severe and fatal cases.

Both diphtheria and scarlet fever may be caused by milk poisoned with the germs of these diseases. There are on record at least 14 epidemics of diphtheria caused by milk.

In only one of these epidemics did any of the attendants about the dairies have diphtheria before the disease broke out among the customers. In one instance it broke out among the dairy hands and the customers at the same time. In five of these epidemics the dairies were in very unsanitary conditions; untrapped or open drains allowed noxious gases to reach the milk and milk pans. In this way a small amount of the contagion got into the milk and developed so rapidly as to infect a great many people.—*Half's Journal of Health*.

HOW TO SELECT ROPE.—A German paper, in an article on the methods of rope manufacture from hemp and the determination of the different qualities and the probable strength from the appearance, lays down the following rules: A good hemp rope is hard but pliant, yellowish and greenish gray in color, with a certain silver or

pearly luster. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibers were damp, and is consequently weak and soft in those places. Again, sometimes rope is made with inferior hemp, on the inside, covered with yarns of good material—a fraud, however, which may be detected by dissecting a portion of the rope, or in practical hands by its behavior in use; other inferior ropes are made with short fibers, or with strands of unequal strength or unevenly spun—the rope in the first case appearing woolly, on account of the number of ends of fiber projecting, and, in the latter case the irregularity of manufacture is evident on inspection by any good judge.

GLYCERINE is one of those substances that always seem to be lending themselves to new and unsuspected applications. It is found that the freezing of water in the hydraulic machinery—a very serious source of trouble in the winter months—is extremely prevented by the simple experiment of mixing a small percentage of glycerine with the water in the pumps. This precaution is now taken in the operation of the hydraulic jack on all ships in the English navy. Glycerine appears to be just as useful in maintaining the efficiency of the human machinery, for it is recommended as a cure for indigestion. A small teaspoonful should be mixed in half a wineglassful of water and taken with or immediately after each meal until the trouble is past, which, in an ordinary case, will be in two or three days' time, and in an obstinate one probably from 10 to 15 days. The treatment will have to be renewed if the indigestion manifests itself again.—*Ex*.

Electricity.

Electricity in the Navy.

Warships, like other large steamers, are being daily transformed into regular factories and machine shops; the sailor now requires a knowledge of engineering as well as seamanship, as he holds in his hand the various appliances which serve to propel and guide the gigantic structure under his control. Electricity, that great source of energy, which can become at will a source of power, light, heat or chemical action, was destined to find numerous applications in the navy, and electric applications on ships are becoming more common every day.

The first use for which electricity was employed in the navy was for exploding torpedoes at a distance, says *Invention*. In consequence of this employment of electricity, the two words torpedo and electricity have become, as it were, almost inseparable.

It is not very long since the charges of powder serving to project self-acting torpedoes from the tubes were fired by means of electric friction tubes, with quite a complication of batteries, commutators and wires, when probably a simple tube-lanyard would have answered the purpose better, the operator in most cases being quite near to the tube.

Electricity has also been recommended and used for firing heavy guns, but claimed advantages should not outweigh the question of inconvenience, for mechanical firing is sometimes more simple and reliable. At the present day, moreover, there is a tendency to recognize the uses of electricity only where of unmistakable utility. It may happen, for example, that the commander of a ship or torpedo officer finds it necessary to fire the broadside of his guns or the locomotive torpedo contained in this or that tube, the training of the pieces having been previously executed, simultaneous firing or the propulsion of the torpedo at the proper moment can undoubtedly be advantageously effected by means of electricity.

The second application of the electric current in the navy was for the transmission of orders to a distance. Whoever has had an occasion or opportunity to witness a sham fight on board a ship of war, or the maneuvering of the machinery or various appliances employed for training and charging heavy pieces of artillery, can form some idea of the difficulty of receiving and transmitting orders on board ship.

Speaking trumpets and, in fact, all the phonic appliances, without excepting the telephones, are, on board, imperfect instruments, for if they more or less answer at the anchorage and when there is not too much vibration, they may become quite useless in the midst of heavy fire. Acoustic pipes, in which there must be numerous bends, often get filled with water; as for telephones, the great vibrations resulting from the firing of the guns, and the changes

of temperature, make them unreliable. Mechanical transmissions are also, perhaps, less practicable on account of the angles and gearing, etc., requisite, owing to the nature of the places and bulkheads crossed; the chances of error and cost of installation are consequently great. The future seems likely to suggest the extended employment of electro-mechanical transmitters, and many are already in use.

The introduction of dynamos soon brought about the installation of generators and powerful arc lamps for the purpose of reconnoitering the enemy at a distance, etc., or the navigation of passages; large ships sailing by night from Port Said to Suez were thus enabled to reduce the time of their passage in the canal by one-half. The incandescent lamp and the construction of dynamos with constant potentials have made the electric lighting of ships really practical. Neatness and safety from fire, the great economy resulting, together with the advantage of not vitiating the air, so difficultly renewed in the lower parts of a ship, and in addition to all this the greater lighting power, distributed as required over the least accessible places, are all good qualities which advocated the introduction and development of electricity into the navy. For the last five or six years, war and mercantile vessels have been largely supplied with electrical apparatus.

The facility with which incandescent lamps can be extinguished or lit from a distance naturally led to their employment for night signals, based upon the number, color or duration of the flashes, or the extinction of lamps placed in lanterns in the masts.

On ships of to-day all the parts below water (the largest in bulk and often the most important) are inaccessible to daylight; their lighting, therefore, must be permanent, and the engines must be run, without stoppage, day and night; yet nothing need prevent utilizing part of the current produced to work small motors like lathes, hoists, ventilators, etc.

At the present time they go even further, and holdy attempt transportation and distribution of power by electricity. Endeavors are made to substitute suitably contrived electric motors for the heavy hydraulic machines now employed for the maneuvering of big guns. The day does not seem far distant when there will be a central generating station provided for distributing light and power over ships. Later, perhaps, heat may be similarly transmitted.

Fault Indicator.

An instrument for automatically indicating the location of a fault on underground conductors has been in use on a very large network in Berlin for over a year, and it appears to have met with success. These indicators sound an alarm at the station the moment a fault is developed and indicate the locality. For this purpose the usual pressure wires are used which are so connected that a certain voltage exists between the copper conductor and the neighboring pressure wire; when a cable is damaged, the short circuit which then occurs between the pressure wire and the copper conductor produces a change in the voltage existing between them, which in turn actuates a relay and an alarm at the station without necessarily preventing the pressure wire from serving its purpose for indicating the pressure; the relay actuates an annunciator which indicates the district, each district comprising about a square. Besides this there are ground detectors at the station which show the condition of the insulation not only of the whole network, but of every single district. The system is based on the fact that the largest part of the loss of potential between the two points connected to earth is at those points, only a small portion being due to the resistance of the earth between the points. The conductors are therefore made to indicate the potential of the earth in the various districts. By means of single relays and simple voltmeter measurements, the locality of the fault is determined at the station. The sensitiveness can be made as great as is desired; the relays, for instance, can be made to operate with one-quarter of a volt or one volt, depending upon whether poor or good ground connections are to be indicated. A somewhat lengthy description of this system may be found in a paper by Dr. Kallmann, in the *Elek. Zeitschrift*, No. 11. The system is one devised by the Allgemeine Elektrizitäts-Gesellschaft.

A lengthy discussion of this paper is contained in the *Elek. Zeitschrift*, April 28th, the greater part of which, however, is devoted to the influence of earthed lighting circuits on telephone lines. The author explains a portion of his system by the aid of a diagram representing an actual case. His system seems to be of considerable impor-

tance, and is well worth the attention of central station engineers. Some of the remarks of Dr. Froelich are of interest. He compares it with his own (complicated) system and states that the former is not applicable if the faults are in the house circuits, where most of them occur. This, however, Dr. Kallmann denies, saying that he has applied it in numerous such cases. Both agree that grounding the neutral wire of a three-wire system diminishes materially the disturbing influence on neighboring telegraph and telephone lines.—Electrical World.

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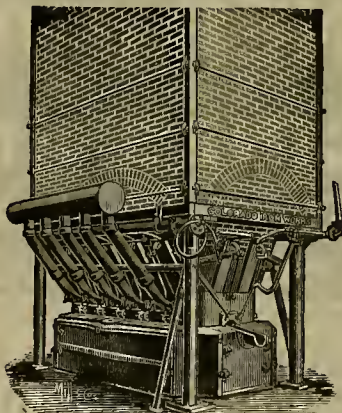
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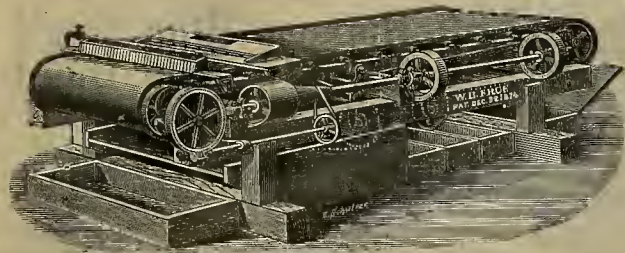
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 MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (40 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for twelve months. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six-foot Frue Vanner too highly, and it is the only table that I would have in my mill.

O. J. CLARK, Gen'l Supt.

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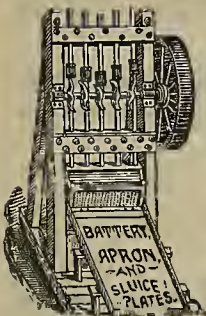
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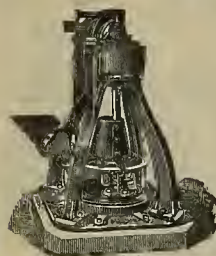
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Mining Summary.

The following is mostly condensed from journals published to the interior, to proximity to the mines mentioned.

CALIFORNIA.

Amador.

WOODBRIDGE.—Amador Dispatch, June 10: The Woodbridge mine near Clinton is being vigorously prospected, and every indication looks favorably for a valuable mine. The tunnel has now reached the ledge, and they are now running the tunnel along the hanging wall of the ledge, taking out about four feet of rock which is of good quality. They have not yet crosscutted the ledge, and consequently they do not yet know exactly how thick it is. The tunnel has already been run along the ledge about 60 feet, and will be run 40 feet farther on the present contract.

WATER.—Amador Ledger, June 9: The Baldwin has been blowing the whistle now for several days. They have a heavy body of water in the shaft, and it will be several days before they get it out so that they can commence work on the orebody. Mr. Knight's hydraulic pump at the Bay State seems now to be giving satisfaction. It is throwing a constant stream of 18 miners' inches of water, and with what they take out with the water tub, is lowering the water steadily, and in a few days, when they open the face of the tunnel, I have no doubt the water will drain to one-half its present depth. They had the same experience in the Onelda mine at one time; the water would break in in heavy streams from the face, filling everything directly, and in some instances it would take three days to drain these subterranean reservoirs. The Pioneer people are putting on quite a number of men, which induces me to believe that they are satisfied with the developments. The rock in the Onelda tunnel has become softer and consequently the work of driving the tunnel will be much accelerated; and, if it keeps as it is now, it will only be a short time until they strike the ledge. I was over last week and examined the property, and my judgment is that they are going to have a fine property here. When they get their tunnel in, they will have backs of some three hundred feet. The Plymouth or Middle Fork ditch runs right by the mouth of the tunnel, and the mountain breaks off so abruptly that it gives them in a few hundred feet plenty of fall to run any kind of machinery, thus giving them a splendid mill-site below the mine into which the ore can be run through chutes. The company is composed of six business men of San Francisco. Mr. Wray, the president, informed me that there was no stock for sale. If the development proved good, they would own it all; and, if not, they were willing to lose.

KEYSTONE VS. SPRING HILL.—The Keystone Mining Co. has sued the South Spring Hill Mining Co. for \$200,000 damages for ore extracted through the latter's shaft from the property of the former. The Keystone asks for the above damages and a perpetual injunction. Lynch & Rust are attorneys for the plaintiffs.

WALLACE VS. AMADOR GOLD MINE.—In Dept. 3 of the Superior Court of the city and county of San Francisco, judgment has been rendered against the Amador gold mine for \$149,259.35, with legal interests and costs, in favor of Wm. A. Wallace. A copy of the judgment was filed in the Recorder's office of Amador county the 7th inst.

Butte.

FROM OROVILLE.—Plumas National Bulletin, June 6: E. A. Hallstead, proprietor of the Oroville Stage Line, came up on Friday last and returned Monday. The town of Oroville is in a prosperous condition, and the mining outlook for Butte county, particularly in the line of quartz, was never better. Capitalists are reaching out for gold mines more eagerly than for many years past. Several big quartz propositions have been developed in Butte recently, and they are proving a success. Numerous are the inquiries also about Plumas mines. Mr. Hallstead is confident that a new era for gold mining is at hand.

Calaveras.

GYPSUM.—Mokelumne Hill Chronicle, June 10: We have been informed by Mr. E. H. Davison, who is superintending operations at the Gypsum mine, which is located about six miles from this place, that he now has out over ten tons and all sacked ready for shipment to San Francisco. The Gypsum is to be used in the manufacture of carbonic gas in one of the principal soda works in the city. Mr. Davison will have a machine for grinding the gypsum to a powder in a short time, when it is intended to ship it in barrels—about 250 pounds to the barrel. Gypsum is worth \$20 per ton in San Francisco, and as the mine in question contains an unlimited quantity, there is every reason to believe that it will be a permanent and paying investment, and also give employment to quite a number of men.

Del Norte.

BEACH SAND MINING.—Del Norte Record, June 10: The Beach Sand Iron Mining Company, below town, will soon be at work extracting magnetic iron from the sand. They have completed a substantial building, which is made "sand tight." Probably many people would like to learn of the process of extracting the iron, but that is a secret, well guarded. It is said that this plant is an experiment, but already the sand prospected shows that it will pay handsomely. The company has a lot of the finest machinery which must have cost considerable. The result of the new mining industry is awaited with great interest. Should it come up to the expectations of the parties interested, it will mean the erection here of a smelter, besides an increase of transportation facilities between here and San Francisco, also the employment of quite a number of men.

Inyo.

LEAD CANYON.—Inyo Register, June 8: Ex-Sheriff J. R. Eldred started for Lead Canyon this morning, accompanied by Mr. James Wright, an old and experienced lead prospector and miner. Mr. Eldred has some excellent prospects in this district. This mining belt is situated about 40 miles from Big Pine, in a southeasterly direction, approachable from the bamlet via Devil's Lute, Marble canyon and Wacoba Springs, points on the Saline

valley borax road. Some good lead ore has been shipped from this section to the Selby Works of San Francisco. The district will receive considerable attention during the present season. Mr. Dailey, of Fish Springs, made a cleanup of \$700 from a 10-ton run of gold ore last week. Tracy & Cunha will commence crushing rock the present week.

Lassen.

A PLACER MINE.—Amedee Geyser, June 6: Some time ago Messrs. John Christie, Bob Squires, Wade Lawson and Wellington Adams took up a claim in Last Chance, about eight miles from Milford. Very little had been accomplished, however, until recently, when the first strike was made. Mr. Sifford exhibited specimens of flake gold taken from the sluice-box while the water was still running, the largest of which is worth 25 cents. That large results may confidently be expected is apparent from the fact that nine cubic feet of earth yielded \$15 worth of the precious metal.

Nevada.

QUARTZ.—Nevada City Herald, June 6: The Live Oak quartz mine, situated near the Delhi, is quite likely to close down pending the settlement of certain difficulties between its owners. The mine is really a big one and has been sufficiently developed to show its value. Two tunnels have been run into this ground, one 100 and the other 120 feet in length, and a large amount of quartz has been taken out and piled up. Conservative miners estimate that there are 10,000 tons of ore in sight, the formation being a large one, and it is said that the ore will pay \$8.50 per ton. It is hoped that some arrangements may be made by which the mine may be worked on a large scale, as it would live up the whole ridge. The Union mine at Relief Hill is looking well, and continues to pay its owners and furnish employment for quite a force of men. A new tunnel is to be run into this ground. At the Derbec work continues as before. Negotiations are said to be pending with Mrs. De Noon, who owns the ground to the east, and if this ground is secured the mine's existence may be prolonged for years to come. Some Live Oak men, while making a trail from their cabins down to the mine recently, ran across the upper end of the Grizzly Ridge Company's ground and uncovered a very good ledge about two feet thick. The Grizzly Ridge has good ore and lots of it. Williams & Co. continue to work their claim in Grizzly canyon and have good rock.

PARNELL MINE.—Grass Valley Telegraph, June 10: The Stewart Parnell mine is situated but a little way from the South Idaho, and the ledge is a parallel one from that most excellent prospect. The mine is owned by Mr. Hogan and a company of miners, and they all have the utmost confidence in the affair. But little work has so far been done on the property, the shaft having just been started. There is a four-foot ledge now in sight, and many pieces broken from the vein show gold. What that country out there will do, no man can tell, as there are innumerable ledges and gold can be found in all of them.

Plumas.

IMPORTANT DEVELOPMENT.—National Bulletin, June 6: The Mercury quartz mine, owned by Lee, Richards & Blakesley, pierces the hill north of Western Ravine beyond Emigrant Hill, and is in the vicinity where existed fabulously rich placer and drift mines in the early days of gold-mining in Plumas, where it was no uncommon thing to secure nuggets whose value ranged up into many hundreds of dollars. The Mercury was discovered about a year ago by Johnny Richards, an old-time prospector. On top of the hill a shaft has been sunk 40 feet. Here the ledge is about 12 feet wide and situated between well-defined slate walls. The ore vein has been developed at different points from this shaft to the bottom of Western Ravine, which cuts it. Evidently the large ore body goes down. The chimney developed at the shaft is of a soft, decomposed nature and shows big prospects, indicating that the ore will yield, by the free-milling process, from \$6 to \$20 per ton. By a short tunnel from the Newtown Flat side, the lode can be tapped at a depth of probably 300 feet. With a 10-stamp mill erected near by, here is a mining proposition worthy the attention of capital. It is in a country that has produced lots of money, prospects well itself, is easy of access and can be worked very cheaply.

FROM RICH GULCH.—A. D. Hallstead was up from Rich Gulch Saturday. He reports the outlook for the Hallstead mine to be very bright. Recent developments inspire greater confidence in the value of this property. The tunnel began several months since is being pushed ahead, and it is now in good ore. The owners think they have about reached the large chimney whose ore near the surface prospected well. The vein matter is now getting softer. That there are five large chimneys on the locations, Mr. Hallstead says the work done thus far fully demonstrates.

BUCK'S RANCH AND GRANITE BASIN.—Reports come to us that the Granite Basin and Buck's Ranch country are full of prospectors, mainly from abroad, and that indications point to lively times in that country during the coming summer, with reference to both quartz and gravel-mining interests. We are glad to hear of this, for certainly there is a large and important field there for discovery and development. The extremely rich body of ore uncovered by See & Jolly last fall demonstrates that very superior quartz veins exist at Granite Basin. The country is practically unexplored and is in need of experienced gold-bunters to find more mines and of capital to open up those already found.

GENESEE MINES.—National Bulletin, June 6: From H. C. Flournoy, who was in Quincy, Monday, we learn that the future of Genesee valley is bright. This valley is conceded to be one of the most charming spots in Plumas. It is a narrow strip, the rugged mountains on either side rising in their grandeur to a height that is almost dizzy. Not only in point of scenic beauty is it interesting, but it has attracted attention among scientific men because of its fossils. Copper, gold, silver and iron ores abound. During the past 35 years, more or less mining has been done in that region and much gold has been extracted. A large part of the ores carry gold, silver and copper, and is of a rebellious nature, a large percentage of the gold even being lost by the free-milling process. There is not the case, however, with all the mines there. During the past month several mining men and representatives of capital have visited Genesee for the purpose of looking at the mining properties

there, with a view of investing. A short time since Messrs. Gullic and Cloud, of Illinois, and Messrs. Hook and Roberson, of Genesee and Backwith, respectively, located a quartz claim about a mile north of the Flournoy ranch. The vein is about three feet wide and carries gold, silver and copper. It can be traced nearly three miles. The locators have begun development work and will continue it during the summer. A Chicago company has been prospecting the old Cooper mine. Their work thus far is reported to be quite satisfactory, the ore on top proving very good. Further prospecting will be done, and if the ore continues good it is stated that the capitalists will erect large reduction works to reduce the rebellious ores and save all the precious metals. The most notable development made in that section lately is that accomplished by George Brown. He is interested in the Green Ledge. About a quarter of a mile above and entirely separate from the Green Ledge, has been exposed to view a large body of quartz which was supposed to be worthless. Mr. Brown began work on it, however, and by running a short tunnel has reached a four-foot ledge of high-grade ore, entirely different in character from that of the Green Ledge below. The owner is extracting some of the quartz and hauling it to an arrastre to test it as well as he can by that process. By means of a tunnel this body of ore can be opened up to a depth of fully 1000 feet and delivered at a point where a mill run by water-power could be erected and operated cheaply. The owners of the Cosmopolitan have resumed the work of driving their tunnel ahead to tap the Mammoth ore vein. John Sobrero, above the Genesee mine, has a small ledge that is considered very rich, though, as yet, it is developed to a limited extent only. Lately some English capitalists were up to see the Cascade gravel mine, on Grizzly creek, owned and operated by P. R. Walsh, of Vallejo. Should a sale be effected, the property will be worked on a large scale. A Dragovich has gone up to the Lucky S mine to begin work. He expects to put in needed machinery and prosecute work actively.

Shasta.

LOCAL MINING NOTES.—Shasta Courier, June 10: With two milling plants running at South Fork, and another one in process of construction, that district ought to come to the front as one of the leading mining districts of northern California. Charles Albino and Fred Forslund have been making some repairs on the old Sam Brumfield ditch from Flat creek, owned now by the Calumet Co. That company also owns a couple of promising mining properties at Flat creek. The old Bob Small and Farmer mine now owned by Vet Hull and Wm. M. Murray, of Shasta, and B. Conroy, of Redding, is showing up in a most flattering manner. Mining men pronounce it to be one of the most promising properties in this section. The ledge is five feet wide on top, and justifies everything that has been said in regard to its richness. Murray and young Conroy are running a tunnel in the hill, being in about 25 feet, and expect to strike the ledge soon. The mine is located near the divide between Iron Mountain and Whiskytown, and is about four miles from Shasta.

Sierra.

COMET.—Mt. Messenger, June 10: We understand that parties will be here from the lower country shortly to undertake the development of the Comet Consolidated quartz property, in Jim Crow canyon. It will be but a very short time before others of our many valuable quartz deposits in this vicinity will be bonded or leased to those who can afford to develop them, and then prosperity will be bound to follow. Sierra county's quartz ledges are comparatively unexplored, and contain many thousands of dollars. Work at the Maple Grove drift mine, Alleghany, has been suspended, but will be resumed next fall. Gravel at the Excelsior drift mine at Cedar Grove near St. Louis, northern Sierra, is paying \$4.50 a carload. This mine promises to become one of the best in the county, as it undoubtedly has the upper part of the noted Howland Flat channel.

Siskiyou.

CLEAN-UP.—Yreka Journal, June 12: Mr. Rider, of Humburg, spent a few days in Yreka last week, and says they have an abundance of water and have just commenced to clean up after five months' sluicing, and anticipate a fine clean-up. The Lang Brothers, of Humburg, were in town last week. They have had the best supply of water and this has been the best year for mining that there has been in this county for ten years. They have piped off a big piece of ground, and, as they have an extensive claim, they will certainly realize a fine clean-up. Clark & Wheeler have had five tons of ore from their mine on Middle Fork of Humburg crushed at McCook's mill as a test, and the result was highly gratifying. There has been a number of mining men in Yreka, from the lower cities, during the last week, looking after some of Siskiyou's valuable mines with a view of investing. They went to Humburg and other places to investigate for themselves the buried treasure.

Trinity.

LOOKING WELL.—Journal, June 10: We have been informed that the outlook of the Enterprise Company at East Fork is very bright, more so than it has been for some time. The mill is and has been running several weeks on ore taken from the Lone Jack location, and the plates show up very encouragingly.

Tuolumne.

THE KINCAID MINE.—Independent, June 10: Situated in Kincaid's Flat is a mine known as the Kincaid mine. It is of gravel formation and worked by a hydraulic monitor, with a pressure of about 200 feet fall, coming from the adjoining hills, through a 12-inch pipe. The hole, or mine itself, is about 60 feet in depth by 300 in length and 100 feet wide. A constant flow of water from the monitor is kept on the walls being worked, and every other day the full force of the stream is turned on. The force of this stream is something wonderful. The slightest touch turns it in its course, while wherever the stream strikes, it tears everything before it, turning and upturning huge boulders as if they were mere pebbles. The flume conveying this water, after it has performed its duty, runs through a tunnel in the mountain, which is about a mile in length, and flows into Sullivan's creek. For years past this mine has been worked in this manner, yielding to its owners a large income.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, June 10: 1500 level.—The drift started west from the end of the southwest drift, 75 feet above the sill floor of this level, has been extended during the week 15 feet; total length 92 feet; ending in hard porphyry. From this west drift, at a point 30 feet in, a south drift has been run 30 feet in a quartz formation which assays from \$2 to \$3 per ton. 1650 level.—Have continued making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working west from the old stopes, on the third floor, operating through the upraise, No. 6 carried up from the main northwest drift. Also from the old stopes in working north from the crosscut run west from the northwest drift. The crosscut run east from the drift run south from the end of crosscut run east from a point 60 feet up in the upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 32 feet; total length 55 feet, continuing in porphyry and quartz showing some value. Have continued to extract some ore of average quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. The drift running south from this winze at a point 52 feet down has been extended 20 feet; total length 60 feet; in a porphyry and quartz formation. Have extracted during the week from all parts of the mine 178 cars of ore about 175 tons, the average assay value of which per car sample was \$28.49 per ton.

OPHIR—1565 level.—The work of pumping out the water which was reported last week to be flowing into the crosscut run west from the bottom of the winze sunk 52 feet below the sill floor of this level having been suspended, the water there has risen 28 feet and become stationary in the winze 24 feet below the sill floor of this level. From the winze station on the sill floor of this level an east crosscut was started and has been advanced 21 feet in a formation of porphyry, clay and quartz, which carries a low assay value. Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican company.

MEXICAN.—On the 1565 level.—West crosscut No. 2 from the north drift from east crosscut from the bottom of the winze, sunk from the 1465 level down to this level near the south boundary, has been extended 14 feet; total length 295 feet; continuing in a very hard porphyry formation. Have continued the work of making the necessary repairs in the shaft, being joint work with the Ophir company.

UTAH—340 level.—A north drift from the west crosscut No. 3, at a point 100 feet in from its mouth, has been started and advanced 7 feet. No work has been done in the face of west crosscut No. 3 during the past week, as the flow of water is too strong to work to advantage. Have repaired the south drift from the end of the west crosscut from main shaft.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 16 feet, making the total length 386 feet; the face is in porphyry, clay and quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 19 feet, making the total distance west of the joint shaft 3247 feet; the face is in hard porphyry, and streaks of clay and quartz.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level has been advanced the past week 19 feet, making the total distance west of the shaft 3247 feet; the face is in porphyry and streaks of clay and quartz.

ANDES.—On 420 level have been repairing main north drift. Have started a south drift from east crosscut No. 1 north, and advanced it 12 feet. This drift is all in quartz.

GOULD & CURRY—200 level.—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 10 feet; total length 503 feet; passing through hard porphyry. Suro tunnel level.—During the past week we have been laying a switch and have started jointly with the Best & Belcher company, at a point in the northeast drift, at a point 122 feet from the main north drift, an east crosscut (No. 1) and advanced same 8 feet; face in porphyry and small stringers of quartz.

BEST & BELCHER—200 level.—West crosscut No. 2, started in northwest drift, 230 feet from our south line, has been advanced 13 feet, passing through quartz; total length 143 feet. 900 level.—Work has been discontinued in west crosscut No. 4. We have resumed work in southwest drift 112 feet from crosscut No. 3, and advanced same 15 feet through hard porphyry, total length 129 feet. Suro tunnel level.—During the past week we have been laying a switch and have started jointly with the Gould & Curry company at a point in northeast drift 122 feet from the main north drift, an east crosscut No. 1, and advanced same 8 feet; face in porphyry and small stringers of quartz.

HALE & NORCROSS.—1800 level.—We resumed work on Monday, the 5th inst., and carried up the upraise in west crosscut on our south boundary on this level 16 feet making total height 66 feet. The top of upraise continues in quartz. Main shaft.—We continue retimbering above the 1300 level, and are retimbering main incline where most needed. When the necessary preparations are completed we will begin work on the 900 level with a view to doing extensive prospecting in unexplored ground on that level.

CHOLAR.—We are making repairs on the 450 level, and making repairs to the north drift, 850 level. Have started a drift north from the east crosscut near the south line, 930 level, at a point 250 feet east of the footwall, which is now out 24 feet; face is in clay and porphyry.

WARD SHAFT.—Work during the week has been confined to lining up the shaft and making repairs to the donkey pump on the 1800 level.

BULLION.—Work at the Ward shaft during the past week has been confined to lining up the shaft and making repairs to the donkey pump on the 1800 station.

EXCHEQUER.—Work at the Ward shaft during the past week has been confined to lining up the shaft and making repairs to the donkey pump on the 1800 station.

ALPHA.—Work at the Ward shaft during the past week has been confined to lining up the shaft and making repairs to the donkey pump on the 1800 station.

POTOSI—The south drift, 35 feet west of the main shaft on the 550 level, is out 32 feet; face is in porphyry. The south drift 200 feet east of Potosi winze, 930 level, is out 32 feet; face shows five feet of fair milling ore. The north drift, opposite the last named drift, is out 110 feet; face shows from three to five feet of good ore. There are three feet of fair grade ore in the top of raise from north drift 930 level. The north raise, above the 1000 level is 134 feet on the slope; top shows seven feet of good ore. The south stope above the 1000 level, 120 feet south of top of raise from the 1100 level, is out 80 feet; face is in porphyry. Extracted and sent to the Nevada mill the past week 709 tons and 1250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 620 tons. On hand at mill 180 tons and 750 pounds. Average battery assays, \$28.14; average car sample assays, \$31.24; shipped to the U. S. Mint, Carson, 354 pounds crude bullion.

OCCIDENTAL—We are extracting ore of fair quality from the south drift, 650 level. The upraise from south drift, 650 level, started at a point 310 feet south of main winze, is up 11 feet; the top shows bunches of ore. Have stopped work on the 750 level for the present. No 3 crosscut from Zedig drift, Sutor tunnel level, has been extended 15 feet; face in quartz and porphyry.

KENTUCKY—Have stopped work on the 160 level and moved all the men to the 1100 level. On the 1100 level we have extended the main south drift a total distance of 45 feet, in ore of milling value. The raise near the north line is up 28 feet in ore of milling value. The joint east crosscut on the Jacket south line is in a total distance of 47 feet; face is in ore assaying \$26 per ton.

Central District.

NEW GOLD DISCOVERY.—*Silver State*, June 10: L. F. Dunn returned last night from a prospecting trip. After making several rich placer locations in the Humboldt range, he went over into Central district. There he discovered a gold ledge four feet in width, and as the miners say, it was "lousy with gold." It was found about 500 feet north of the northern boundary of the Blackbird and Fellows' claims, and lies between a slate and sienite formation. He says these other claims are spurs of his mine—that he has the mine of the district. Dunn and M. S. Bonfield are the locators. In early days it was thought that our mines of value were silver mines and little attention was paid to gold. But, from the valuable mines now being worked and new discoveries made in Central, Rebel Creek and Kennedy districts, it seems we have most valuable gold veins. Besides, hundreds of Chinamen and a great number of white men are taking out large quantities of gold from the many placer claims in this county. Dunn says the goldbugs cannot get the best of him, as inside of 12 months he will have more gold than any of them.

Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, June 11: The Eureka and Palisade Railroad Company received during the month of May 2173 tons of ore from the mines of Eureka district for shipment to Salt Lake City, as follows: From the Diamond mine, 1144 tons; Eureka Con. Mine, 381 tons; Jackson mine, 174 tons; Richmond mine, 134 tons; Hamburg mine, 110 tons; Phenix mine, 61 tons; Dunderberg mine, 31 tons; Bullwhacker mine, 15 tons; Williamsburg mine, 15 tons; Delaware mine, 13 tons; R. J. & Co., 13 tons; Ethel mine, 11 tons, and Rescue mine, 11 tons. From Hamilton, White Pine county, from C. A. Mathewson, 18 tons; Tom Cornell, 45 tons, and Zanni Brothers, 50 tons. Total from White Pine, 113 tons.

Jefferson District.

DEVELOPING.—*Silver State*, June 10: Henry Hancock informs us that they had pleasant weather at Jefferson during the past month, and that the mine-owners are developing their mines in that district.

Kennedy District.

ORE SHIPMENT.—*Silver State*, June 8: Benton & Kennedy made a shipment of 45 tons of ore last evening to the Reno Reduction Works. The ore is from the Imperial mine, in Kennedy district, and is expected to average about \$80 per ton.

TO RENUE SOME ORE.—*Silver State*, June 9: Mr. Kennedy, the discoverer of the rich gold mining district in this county, which bears his name, is in Reno making arrangements to have 75 or 100 tons of ore worked at the Reno Reduction Works.

ORE SHIPMENT.—*Silver State*, June 13: E. S. Archer, agent of the Portland Smelting Works at Linnton, Oregon, yesterday made another shipment of 20 tons of ore from Kennedy district. Fifteen tons of the ore are from the Goldnote mine and five from a claim owned by A. Barrett.

Tuscarora District.

CAMP NOTES.—*Times-Review*, June 6: The De Frees mill, which was disabled for a few days, has been repaired and is running again. The Pondere ore shipped by A. A. Rose to Salt Lake for reduction, we understand, yielded beyond his most sanguine expectations. Leasers in the Navajo and the two Isles will ship their ore in a few days, as "the butcher, the baker and candlestick-maker" all "wanta da mun." Ore was struck in the Rubé Batters shaft on West avenue yesterday afternoon, but its extent and richness has not yet been ascertained. Ore stealing has been carried on with a pretty high hand of late. Some of the crooks have succeeded in getting safely away with their hoards; others are awaiting a favorable opportunity to skip out with their ill-gotten gains, and the companies are dead on their racket.

LOWER CALIFORNIA.

GOLD QUARTZ.—*S. F. Chronicle*, June 13: Among the arrivals from Santa Domingo, Manuela Lagoon, Lower California, this week, is John Cranz, who for four and a half years has been buried in the mountains of the peninsula while engaged in the cattle and mining business. Mr. Cranz says: "There are some marvelously rich gold quartz mines, known as the Calmali properties, developed by Emiliano Ybarra, 50 miles east of Santa Domingo, in the backbone of Lower California, and these have just been sold to a party of San Francisco capitalists. There is, I am informed, \$500,000 worth of mineral in sight, and I believe that in a couple of years there will be 10,000 people there. All the country about there is rich. It is a richer region than that about Grass Valley, if possible.

The purchasers are John D. McKee of Tallant's Bank, Mr. Cantrell of the National Iron Works, Mr. Schacht of Schacht, Lemcke & Steiner, the merchants of Drumm street and M. C. Rhodes, the engineer who reported on the mines. The amount paid is a secret, but was undoubtedly a big figure. The purchasers came up on the steamer Carlos Pacheco with me." Mr. Cranz says the purchasers of the mines will put on a force of 400 men and develop them rapidly. There are 16 claims and all show ore. The pay streak in some places is two feet thick. The footwall is granite and the hanging wall slate. Mr. Cranz is on his way to Europe, to be absent several months. He predicts that there will soon be great activity in gold mining in Lower California.

MEXICO.

NEW "DIGGINGS."—*Tombstone Epitaph*, June 10: Mr. Jas. T. Dryden, who came in yesterday from the new "diggings" below the line, is an old, experienced miner, having mined and prospected in Mexico and Arizona for the past 12 years. He says there is no doubt plenty of gold there, and it can be profitably worked. The diggings are some 30 or 40 miles below the line, and there are evidences of their having been worked many years ago, but the early workers had by no means got into the richest dirt. There are some 30 Mexicans there and 6 Americans, who are working the ground in a primitive way and are realizing from \$15 to \$20 a day each. Since work was begun, about three weeks ago, some \$10,000 have been taken out. Provisions are high-priced and scarce, and those contemplating the trip are advised to outfit themselves accordingly. Flour is worth \$16 a hundred; beans are a luxury and command 25 cents a pound, and hard to get at that price. As there is a mescal distillery about 20 miles distant, there is a sufficient quantity of that beverage to quench the thirst at 12½ cents a drink and the owner is coining money. Water is very scarce and has to be hauled eight or nine miles for drinking purposes. Mr. Dryden brought up several ounces of coarse gold with him, and those who saw it immediately became infected with the fever. Should more favorable reports of the new diggings be received, an exodus from Tombstone may be looked for. Mr. Dryden left early this morning for the diggings, and promises us a report in the near future.

MONTANA.

A TEST PLANT.—*Butte Inter-Mountain*, June 10: P. A. Largey, of this city, is making extensive preparations for the erection of a test plant near the Liquidator concentrator in Meaderville for the treatment of the vast quantity of tailings in that locality. During the past week J. M. Montgomery & Co., the machinists, have been engaged in fitting up a number of Chili mills for this purpose. These mills are being remodeled after the pattern of the Bryan mill and will be thoroughly tested. If the tests with this apparatus is not satisfactory, the Mc-Kim process will be given a trial. It is estimated there are nearly a million tons of tailings in the creek between the railroad bridge and the lower works of the Boston & Montana Company, and if this vast quantity can be worked at a profit, employment will be furnished to a great number of men.

THE ANSELMO.—The Anselmo mine, across Missoula gulch, has been closed down, the lessees being unable to make suitable arrangements with the owners, one of the conditions required by the latter being that the lessees should sink 250 feet during the next 12 months. During the past year the Anselmo has produced over \$30,000 worth of ore, much of this being obtained from the old workings abandoned by former lessees. Rich bunches of silver quartz were encountered near the surface, some of which assayed as high as 400 and 500 ounces to the ton.

THE NEVER SWEAT.—Sinking from the 700-foot level of the Never Sweat property was commenced last week and work will be prosecuted until the 800-foot level is reached. Two boilers of 75-horse power each were placed in position at this property during the week. The engine is being manufactured at an Eastern iron works and is not expected to arrive for some time. A temporary engine will, however, be used until the new one arrives.

THE BLUE JAY.—The work of developing the shaft at the Blue Jay is still in progress under the direction of the Butte & Boston officials. This property was worked by Dr. Whitford and others some four years ago. The Parrot workings traverse this property, and some three years ago the Parrot miners tapped the Blue Jay shaft, which at that time was full of water. The water went through the Parrot workings with such rapidity that several of the miners had narrow escapes from drowning. The Blue Jay ground is not considered by the Parrot miners to be a very promising field for mining operations. There is a six-foot ledge which assays well in iron, but shows very small quantities of copper and a great quantity of "black jack" in that locality.

THE ONEIDA.—The Oneida property, near the Silver Bow mill, will be in operation again next week, Messrs. Davis, Porter & Co. having secured a lease on the ground. This property was worked last year by F. A. Heinze, who spent some \$7000 in the work of development, but who abandoned it when he secured the lease on the Stella. T. M. Adams, the owner of the Oneida, has worked a few men this year, and recently encountered an 18-inch streak of copper ore which assayed about 10 per cent in copper and several ounces in silver.

LEXINGTON.—At the Lexington mine no work is being performed below the 800 level. Recently a number of miners secured a lease on the ground above the 400 level of this property. These lessees will work the old stopes and drifts, but will not be allowed to touch any virgin ground. The royalty will be graded according to the quality and amount of ore extracted. The lessees furnish all materials. The working of these old stopes will be an excellent thing for the mine, and will permit of the cleaning up of a great deal of ground, parts of which contain bunches of good mineral.

THE BELMONT.—The Butte & Boston people have decided to develop the Belmont mine, which is now being worked in a small way, and to this end a contract will be let shortly for the sinking of the shaft an additional 200 feet. The shaft is now developed to the depth of 225 feet. The Belmont is situated in the rich Ground Squirrel district and has produced some very rich ore during the period it was worked.

THE TRAMWAY.—The machinery has been placed in position at the Tramway, one of the Butte & Boston new properties, and next week the work of pumping out the water in the 250-foot shaft will be commenced. Just as soon as the shaft is cleared of water the company will renew the work of development, the first work contemplated being the sinking of the shaft to the 350-foot level.

PHILLIPSBURG MINES.—*Mail*: The development of the Royal gold property has again been resumed, and it is said that about a dozen men are employed there at present. The principal work will be in tunneling and crosscutting, with the probable addition of power drills to facilitate the work. Considerable ore is being taken out at present from the Two Per Cent property, near Tower, and the parties who now have it under lease are hopeful that the present showing will continue to improve, which, if it does, will afford them a good profit on their work. The Hope Company has purchased a new Sullivan diamond drill, and have begun prospecting with it on the hillside above the mouth of the Jubilee tunnel.

OREGON.

THE SPENCER.—*Ashland Tidings*, June 10: The Spencer mine, seven miles west of Coles, Cal., is one of the new mines in this region already opened and put upon the basis of paying property of established value. It was bought last year by Mr. Spencer of Portland, W. W. Walters, C. B. Kingsbury and Phillip Mullen of Ashland. Walters sold his one-sixth interest last fall to Mr. Kingsbury for \$5000, and now the mine is owned by Spencer, Mullen and Kingsbury, each having one-third. Their lode is a vein varying in thickness from 6 to 18 inches and shows paying prospects wherever tapped, from the surface to the bottom of their deepest shaft. The development consists of two tunnels, air shafts and a number of drifts from which ore has been taken for milling already done and yet to be done. The first tunnel tapped the ledge about 40 feet vertically from its surface croppings, and at this level drifts have explored the vein for a distance of 150 to 200 feet. Their new tunnel is 77 feet vertically below the first, its length being 90 feet from opening. From the lower tunnel a shaft is down 25 or 30 feet, and better ore is shown there than in the upper levels. The ore is crushed by a Tremaine mill—two stamps operated directly by steam pressure—and is supposed to be worked up at the rate of three to five tons in 24 hours. The mill turns out from \$300 to \$350 a month with cheerful regularity. An extension of the Spencer mine on the north is owned by Mrs. Hilt and sons, and one on the south by Mr. Fisher of Lane Co. Both are sinking prospect shafts, and a test run of ore from each extension was run through the mill before it began its regular work upon rock from the Spencer mine. The result was satisfactory enough to keep both parties at work at the prospecting.

WYOMING.

GOLD DISCOVERIES.—A special dispatch to the *Examiner* from Cheyenne says: Information has been received here confirming the wonderful gold discoveries at Miners' Delight, near South Pass, in Fremont county. The principal discoveries are in a mountain containing an immense deposit of conglomerate or Potsdam cement, which miners say once formed the bed of a mountain torrent. Tests have been made by the first locators which show the whole body to be rich in gold. Mill runs show uniform results varying from \$10 to \$20 per ton. There are also rich placer fields in the range which parties are preparing to work when the snow disappears. The camp is reached by a stage from Rawlins on the Union Pacific railroad, a distance of 140 miles. A new road is being opened from Point of Rocks station which reduces the distance to 70 miles. The snow is still deep in the mountains, and active operations cannot be begun for two or three weeks. It is asserted by competent authority to be the greatest gold region found since the early days of California.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 6, 1893.

498,837.—DYNAMOMETER—H. C. Behr, S. F.
499,122.—FRUITS-PRICING MACHINE—Burrell & Doidge, Wrights, Cal.
498,092.—HAND PUNCH—W. Carey, Forest Hill.
498,843.—LABEL-PRINTING MACHINE—N. P. M. Close, Tustin, Cal.
499,100.—HOSE COUPLING—P. H. Denoyer, Sprague, Wash.
498,780.—HOSE FASTENER—R. Franken, Pomona, Cal.
498,133.—FURNACE—J. L. Gironx, Jerome, A. T.
498,847.—HOSEY HORSE—A. T. Godhe, Pioche, Nev.
499,104.—STOOL—Graham & Curtis, Easton, Wash.
498,829.—MATCH-PACKING MACHINE—Geo. Grisel, S. F.
498,757.—FAUCET—R. Hagen, S. F.
498,738.—FAUCET ATTACHMENT—R. Hagen, S. F.
498,113.—THRASHER—Benj. Holt, Stockton, Cal.
499,114.—TRACTION ENGINE—Benj. Holt, Stockton, Cal.
498,957.—BITUMINOUS ROOF MACHINE—J. B. Jardine, S. F.
498,979.—ANALOMATOR—R. J. Kennedy, Redlands, Cal.
499,127.—WATER-WHEEL BUCKET—F. Von Lecht, Mirabel, Cal.
499,133.—CAR COUPLING—L. S. Manning, Alessandro, Cal.
499,135.—JOINT—C. C. Merrill, Riverside, Cal.
499,031.—DISH CLEANER—C. Palmes, Seattle, Wash.
The following brief list by telegraph, for June 6, will appear more complete on receipt of mail advice.

California—August G. Dammer, Alameda, roof framing rule; Wm. H. Cook, Riverside, tree support; Josiah A. Dewey, San Francisco, folding bedstead; Robt. F. Dockery, Highland Park, apparatus for irrigating; Juan W. Ernest, Los Angeles, duocax ball-tobacco; Maurice Friedberg, Stockton, self-timing attachment for bicycles; Andrew J. Haskell, San Francisco, re-sawing machine; Chas. G. Haub and J. F. Dasha, San Francisco, musical toy; Malcolm MacLeod, Los Angeles, agricultural implement; Isaac Polhemus, San Diego, bicycle attachment; Alexander J. Rudolph, San Francisco, card catalogue and index, book index and file, and continuous file and index (three patents).

Oregon—Bernard W. Carrington, Heppner, conductor's railway indicator; Ernest N. Walker, Lake View, spring snap.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SOLENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FURNACE.—Joseph L. Gironx, Jerome, Yavapai Co., Arizona. No. 499,138. Dated June 6, 1893. The object of this invention is to provide certain improvements in the construction of smelting furnaces by which the inventor is enabled to extend the life of the furnace; to make it easy to remove and repair any portion which may have become worn out or destroyed; to remove the lower section or crucible from the remainder of the furnace for the purpose of discharging its contents and cleaning without disturbing the upper portion of the furnace. With this improved construction it is easy to obtain access to clean the furnace frequently, which keeps it in good running order for a long time. When it is desired to close down the furnace the screws which support the crucible are lowered so as to let the crucible down from the upper portion of the furnace, which then remains suspended by its rods. The crucible is then run out upon the car upon which it is transported, and the bolts which hold the two segments or sections together are removed so that the two halves may be taken apart. This leaves the metal which remains in the crucible loose and free from everything, resting upon the cast-iron plate. It is then easily removed from the plate, the two halves of the crucible are again bolted together, and the car run in again beneath the furnace. The screws are then turned up so as to raise the crucible into contact with the upper sections of the furnace, and the whole is ready for further operation. By this construction the inventor claims to be able to remove any portion of the furnace that may be burned out or need repairs without destroying the whole furnace.

SEPARATOR.—Fairfax H. Wheelan, Santa Barbara. No. 498,597. Dated May 30, 1893. The invention relates to that class of separators in which the separation is dependent upon the different sizes of the particles to be separated, enabling them to pass through apertured barriers, to be arrested thereby according to their dimensions. It consists in a traveling carrier having its surface provided with grooves, corrugations or channels at an angle to its direction of travel, said grooves or channels being adapted to receive and carry the material to be separated, and a fixed apertured barrier operating transversely in the grooves, corrugations or channels of the carrier in such a manner as to allow the particles of material of a given size and under to pass through the carrier and to arrest those of a larger size. The object of this invention is to provide a simple and effective separator of this class, which, while adapted to the separation of any material, according to the different dimensions of its particles, is especially adapted for separating barley and oats from wheat. Wheat, barley and oats differ from one another more in their length than in any other separating characteristics, the barley and oats being generally longer than the wheat. This distinguishing feature is utilized in this machine by allowing the shorter wheat to pass the apertured barrier while the longer grains of barley and oats are arrested.

CAR-COUPLING.—Frank M. Ryan, S. F., assignor of one-half to Walter T. Smith. No. 498,575. Dated May 30, 1893. This invention relates to improvements in automatic car-couplers which insure the coupling of the cars whenever they are brought together, and which enables the operator to uncouple the cars either from the side or from the top, without going between the cars or exposing himself to danger. This mechanism consists of a link connected by a rod with the parts to be moved to uncouple the cars, and this link is connected with two levers, one of which extends to the side and the other to the top of the car. The link is elastically so that either of the levers may be employed without disturbing the other. The coupling is simple in construction and easy of disengagement. The men do not have to leave the wheel to disconnect, so it is safe for the operator. The lock is entirely automatic, and the coupling is adapted to the use of link or pin. There is no spring. There is a side lever for yard work, and there is play enough on the pin to start each car separately. The inventor claims that a flying switch can be made with this coupler on an up grade.

WATER-WHEEL BUCKET.—Ferdinand Von Leicht, Mirabel, Lake county. No. 499,127. Dated June 6, 1893. This invention relates to that class of water-wheels in which the wheel or disk is mounted and rotates in a vertical plane, and has secured to its rim a series of buckets adapted to receive the impact of a stream of water under head or pressure. The objects of the invention are, first, to utilize the full power of the water, both in impact and reaction, and to discharge the water equally on all sides; and second, to connect the bucket with the rim in a simple and secure manner. The bucket has a concave hemispherical face with a central uprising cone, which cone receives the impact of the stream and spreads the water all over the surface of the face. The impact is central and the reaction is equal throughout the whole extent of the face.

MATCH-PACKING MACHINE.—George Grisel, S. F., assignor of two-thirds to Joseph D. Case and Frank Severio. No. 498,899. Dated June 6, 1893. The invention relates to the class of machines for packing articles in bundles, and it is especially intended for packing block matches and wrapping them in bundles. Block matches

are those formed from a single block of wood by splitting the block in different directions, the splints being held together at their lower ends by a thin web of wood, and said blocks are dipped into the material for making them into matches. In practice the blocks are divided into smaller blocks of one hundred splints or matches each. These small blocks are wrapped around their composition ends with paper for protection, and they are then made into bundles of any required number, say twelve, and wrapped with paper into packages. The object of this machine is to take these small match blocks after they have been each wrapped with the protecting piece of paper and lay them up in bundles of twelve more or less and then wrap these bundles with paper into packages. The machine is quite an ingenious one, and 33 claims were allowed upon it by the Patent Office.

MACHINE FOR PICKING PRUNES OR PLUMS.—James B. Burrell and Wm. J. Doige, Wrights, Santa Clara Co. No. 499,182. Dated June 6, 1893. This invention consists of a machine for picking or puncturing the skins of prunes and plums. It is a common practice in the drying of these fruits to cut their skins. This is done by dipping in lye, and the fruit thus cut dries much more rapidly and more satisfactorily. The object of this invention is to provide a suitable machine for mechanically cutting the skins of prunes and plums by pricking or puncturing them. The essential feature of the machine is an agitating table or other surface provided with pricking points. The fruit is supplied to the table or surface, which, by its movement, causes the agitation and advance of said fruit over the pricking points, thereby causing their skins to be punctured.

TRACTION ENGINE.—Benjamin Holt, Stockton, No. 499,114. Dated June 6, 1893. The invention relates to improvements in traction engines, and it consists in the attachment of a supplemental vertically adjustable frame with supplemental traction wheels journaled therein exterior to the main frame and main traction wheels for the purpose of increasing the bearing surface upon soft ground. The object of the invention is to provide supplemental wheels journaled in frames exterior to the main frame, said frames being movable vertically, with relation to the main frame, whereby the supplemental frames adjust themselves to inequalities in the ground, and when soft ground is encountered, into which the main wheels sink to a greater depth than is desirable, the upward movement of the supplemental frames is arrested so that the weight of the main frame is brought to bear upon the supplemental frame, and its wheels support a portion of the weight of the machine.

COLLAR AND NECKTIE FASTENER.—Charles P. Ware, San Rafael, No. 498,592. Dated May 30, 1893. This invention relates to that class of fasteners for collars and neckties in which a single body-plate carries a shanked head or stud for holding the collar, and a clamp for engaging the necktie. The objects of the invention are several and may be generally stated to be: First, providing for the wearing of a collar which by accident or design is much larger than the neck-band of a shirt; second, the holding of the collar well down to the yoke of the shirt; third, the holding of the collar firmly and maintaining the position of the body-plate; and, fourth, the fastening of the cravat in place in front and its retention in the back, preventing riding up.

TRAVELING THRASHER.—Benjamin Holt, Stockton, No. 499,113. Dated June 6, 1893. The invention relates to a traveling thrashing machine of that class which is usually joined with a header attachment by which the grain is cut and delivered to the thrashing machine from which it passes to the cleaning apparatus. The object of the present invention is to provide a novel mechanism whereby the main bearing wheels upon both sides of the machine take part in driving the carrying and cleaning mechanism and that portion of the moving parts which is situated behind the thrashing cylinder.

The Assay Laboratory at the World's Fair.

One of the most interesting exhibits of the Department of Mines and Mining is the Assay Laboratory in the southeast corner of the gallery. The analysis of ores, clays, coals, etc., on exhibition will constitute the chief work of the chemist in charge. It is interesting to note that the only furnace used in this official laboratory are the Hoskins Hydrocarbon Blowpipe and Furnaces. The Department having expressed a desire to use this well known apparatus, Mr. Hoskins furnished the laboratory with a full line of these goods. It will be well for those assayers who visit the fair to call at the laboratory, where they will, besides seeing many things of interest, meet a pleasant gentleman in the person of Prof. J. S. Cary, the official chemist in charge. Prof. Cary is a graduate of the Sheffield Scientific School, Yale College, and has spent three years in Germany under Fresenius at Weisbaden.

Business Increasing.

The J. H. & D. Lake Co., manufacturers of all kinds of Friction Clutch Pulleys, having outgrown their old quarters at Hornellsville, N. Y., have recently completed and removed to their handsome new offices and foundry at Massillon, O., where, with enlarged facilities, they are prepared to meet the growing demand of their business.

An interesting feature regarding the rapid growth of the Lake Co. is the fact that it came almost exclusively from advertising, for, with the exception of a limited amount of traveling, they have had no representative out on the road, except their card in the various class journals.

Market Reports.

The Markets.

SAN FRANCISCO, June 15, 1893.

THE METALS.—The feature in the metal market during the week has been the strengthening of tin. It has advanced rapidly, and was yesterday up to \$30 20. Copper and lead show little change from day to day.

NEW YORK, June 14.—Following are the closing prices for the week:

Silver in—					
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday	38 1/2	83 1/2	10 80	3 80	19 40
Friday	38 1/2	82 1/2	10 80	3 75	19 05
Saturday	38 3/4	82 1/2	10 80	3 75	19 05
Monday	38 3/4	83 1/2	.....	3 75	20 00
Tuesday	38 3/4	83 1/2	10 80	3 72 1/2	20 00
Wednesday	38 3/4	83 1/2	10 60	3 70	20 20

New York Specie Movement.

The specie movement at New York from January 1st to June 3d was as follows:

	Imports.	Exports.
Gold	\$5,928,192	\$67,667,192
Silver	1,163,350	12,126,316

Total.....\$7,091,542 \$79,793,508

For the week ending June 3d, the gold shipments were \$6,510,900, the largest in some time, and the silver shipments were \$787,503.

Public Money in San Francisco.

J. P. Jackson, Assistant Treasurer United States at San Francisco, reports cash on hand May 31, 1893, as follows:

United States notes	\$44,741 00
Treasury notes, 1890	2,685 00
National Bank notes	15,475 00
Gold certificates	440 00
Silver certificates	179,070 00
Gold coin	27,169,933 00
Standard silver dollars	24,078,794 00
Subsidiary silver coin	3,561,885 80
Minor coin	15 953 49
Total	\$55,068,977 49

Standard dollars shipped in May.....\$62,500 00
Fractional coin shipped in May.....\$65,450 00

San Francisco Metal and Coal Market.

ANTIMONY.			
Per lb.	— @	14	English, B..... @ 18
BORAX.			
Refined, in ear lots	— @	7 1/2	8 1/2 Diam'd tool @ 15
Powder, do.	— @	7 1/2	Pick Hammer @ 10
Concentrated, do.	— @	6 1/2	Machinery @ 8
All grades jobbing at advance.	— @	6 1/2	Toe Oalk..... @ 4 1/2
COPPER.			
Boit.....	22 @	—	TIN PLATE.
Shedding.....	22 @	—	B. V. steel grade
Ingot, jobbing.....	22 @	14 1/2	Spot..... @ 5 3/4
Do, wholesale.....	22 @	13 1/2	Onarcoal, 14x20..... @ 5 3/4
Fire Box Sheets.....	22 @	24	Do roofing, 14x20..... @ 5 3/4
IRON.			
Bar, base.....	22 @	3	Do, do, 20x25..... @ 11 1/2
Norway, base.....	22 @	4 1/2	Spot @ B..... @ 24
PIG IRON.			
Eplinton 3/4 ton.....	20 @	—	SPOT FROM YARD PER TON.
Glenbrook.....	21 00 @	—	Wellington..... 38 00
Am. Soft, No. 1.....	22 00 @	—	Greta..... 7 50
Shotta No. 1.....	22 00 @	—	Nansimo..... 6 50
Pugot Sound.....	20 00 @	—	Gilman..... 6 00
Qay Lane White.....	21 00 @	—	Seattle..... 6 50
Langston.....	22 50 @	—	Coco Bay..... 5 50
Gatherie.....	22 50 @	—	Oannel..... 8 50
Barrow.....	22 50 @	—	Egg hard..... 12 00
Carrollton.....	22 00 @	—	Walled..... 7 25
CHROMIUM IRON ORE.			
Per ton.....	10 00 @	—	Scotch Spill..... 8 00
LEAD.			
Pig.....	— @	4 1/2	TO LOAD—PER TON.
Sheet.....	— @	4 1/2	Austral..... 6 30 @
Bar.....	— @	4 1/2	Liverpool Steam..... 5 50 @
Pipe.....	— @	6 1/2	Scotch Spill..... 00 @
SHOT.			
Drop, sizes smaller than	81	50	Cumberlund..... 12 00 @
Do, B and larger sizes	81	50	Egg, hard..... 10 00 @
Do, bag of 25 lbs	2 00	50	West Hartley..... 7 50 @
Suck, Balls and Chilled	2 00	50	
QUICKSILVER.			
Home trade, pr.	— @	43	English, to load, \$9 50 @ 10 00
Task.....	42 50 @	43 00	Do, spot, in bulk..... @ 10 00
			Do, in sacks..... @ 11 50
			Cumberlund..... 9 50 @

Mining Share Market.

Business on Pine street has been quiet for the past week. There have been some irregular fluctuations, but the changes in price have been very small indeed. There are the usual rumors of improvements in some of the Comstock mines, which have kept prices changing, but there is very little interest in the news from those mines. Owing to the frequent drafts in the mines, Comstock miners are daily leaving for new camps, and lately many with their families have taken their departure from the lode, says the *Chronicle*. Every departing train carries away some miner. The mining population of Virginia is rapidly dwindling, and it is doubtful whether the major portion of those departing will ever return.

Mr. Eckart is still at work trying to get information about deep pumping, but he finds it hard work to find the figures he wants to base his calculations upon. The books were not kept with such an object in view. His report, however, will be a valuable one when completed, as he is going into the subject very thoroughly.

Board Sales of Mining Stocks.

THURSDAY, June 15, 1893.			
9:30 A. M. SESSION.			
300 Andes.....	35c	250 Mexican.....	1.30
1000 B. & W.....	1.25	1000 B. & W.....	1.85
1000 Belcher.....	1.25	3000 Overman.....	50c
1350 Chollar.....	70c	800 Potomac.....	2.50
250 Crown Point.....	70c	3500 Oat & Va.....	75c
350 Con. Oat & Va.....	1.35	50 8 B & M.....	25c
2 1/2 Gould & Curry.....	9c	250 Sierra Nevada.....	1.00
100 Hale & Norcross.....	75c	135 Union.....	90c
500 Kentuck.....	75c	500 Yellow Jacket.....	1.65
		3000.....	1.50
2:30 P. M. SESSION.			
500 Mexican.....	1.25	250 Belcher.....	1.30
250 Con. Oat & Va.....	1.30	1000 Bullion.....	55c
350.....	1.8	1000 Exchange.....	10c
60 Chollar.....	35c	300 B. & W.....	25c
200 Potomac.....	2.4	300 Overman.....	55c
300 Crown Point.....	70c	300 Justice.....	15c
500 Yellow Jacket.....	1.75	1000 Union.....	95c
130.....	75c	50 Alta.....	20c
400 Alpha.....	20c		

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ASSESSMENTS.

COMPANY AND LOCATION.		No. AMT. LEVIED, DELINQ. TAND SALE.		SECRETARY.	
Ada Cons M Co, Utah.....	4c.....	May 10, June 10, June 25.....	J H Cripps, Salt Lake City		
Alpha Cons M Co, Nevada.....	11c.....	May 10, June 14, July 5.....	O E Elliott, 309 Montgomery		
Alta M Co, Nev.....	43c.....	April 25, June 21, July 12.....	L Osborn, 309 Montgomery		
Best & Belcher M Co, Nevada.....	54c.....	June 6, July 14, August 4.....	L Osborn, 309 Montgomery		
Cons New York M Co, Nevada.....	10c.....	May 12, June 16, July 10.....	O E Elliott, 309 Montgomery		
Cons St Gothard M Co, California.....	8c.....	May 11, June 15, July 6.....	T Wetzel, 323 Sansome		
Crocker M Co, Arizona.....	1c.....	May 8, July 13, August 3.....	A Waterman, 309 Montgomery		
Crown Point M Co, Nevada.....	61c.....	June 12, July 18, August 8.....	J Newlands, Mills Bldg		
Derheg Blue Gravel M Co, California.....	11c.....	May 31, July 5, July 27.....	T Wetzel, 323 Sansome		
Eclipse M Co, California.....	4c.....	May 11, June 12, July 3.....	O Tuna Saden, 216 Bush		
El Leopoldo M Co, M. Cal.....	3c.....	May 25, July 1, July 20.....	Jabez Howes, 214 Pine		
Gray Eagle M Co, Cal.....	33c.....	April 6, May 30, June 20.....	O C Harney, 309 Montgomery		
Inyo Marble Co, Cal.....	20c.....	May 22, June 26, July 20.....	W W Sargent, Mills Bldg		
Justice M Co, Nevada.....	64c.....	May 15, June 19, July 7.....	R E Kelly, 309 Montgomery		
Lady Washington Cons M Co, Nevada.....	5c.....	April 18, May 23, July 11.....	L Osborn, 309 Montgomery		
North Belle Isle M Co, Nevada.....	23c.....	April 17, May 23, June 31.....	J W Pew, 310 Pine		
Overman M Co, Nevada.....	67c.....	April 23, June 2, June 23.....	G D Edwards, 414 California		
Peer M Co, Arizona.....	15c.....	May 8, July 12, August 2.....	A Waterman, 309 Montgomery		
Red Jacket Cons M Co, Nevada.....	1c.....	May 24, July 15, August 5.....	S M Capp, 415 Montgomery		
Silver Hill M Co, Nevada.....	3c.....	May 23, July 1, July 28.....	D C Bays, 309 Montgomery		
Stanton Cons M Co, California.....	5c.....	April 28, June 1, June 23.....	E F Stone, 305 Pine		
Valenzuela M Co, Mexico.....	1c.....	May 5, June 8, June 26.....	A E Bull, 421 California		

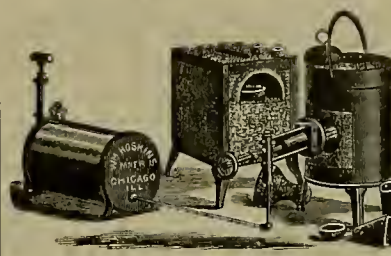
MEETINGS.

COMPANY AND LOCATION.		MEETING. SECRETARY AND OFFICE IN S. F.		DATE.	
Alaska Treadwell M Co, Alaska.....	Annual.....	A T Corbus, Mills Bldg.....		June 21	
Gold Hill M Co, Nevada.....	Annual.....	C A Grow, Mills Bldg.....		June 21	
North Belle Isle M Co, Nevada.....	Annual.....	J W Pew, 310 Pine St.....		June 23	
West Cons Virginia & Cal M Co, Nevada.....	Annual.....	F H Andrews, 324 Pine St.....		June 23	

DIVIDENDS.

COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.		PAYABLE	
Bulwer Cons M Co, California.....	5c.....	L Osborn, 309 Montgomery.....				Oct 20	
Champion M Co, California.....	10c.....	T Wetzel, 310 Pine.....				May 15	
Cons New York M Co, Nevada.....	10c.....	O E Elliott, 309 Montgomery.....				Feb 15	
Great Western Quicksilver M Co.....	25c.....	A Halsey, 328 Montgomery.....				Oct 8	
Lower Gravel M Co, California.....	10c.....	D N Kent, 330 Pine.....				May 18	
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Standard Cons M Co, California.....	10c.....	J W Pew, 310 Pine.....				Dec 23	

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated: General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulae Obtained; Examples and Calculations; Extensive Tables for Ready Reference and Explanation in Formulae and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water through Short Tubes and Compound Tubes; Flow of Water through Pipes; Tables of Velocities are Cubic Feet Flow for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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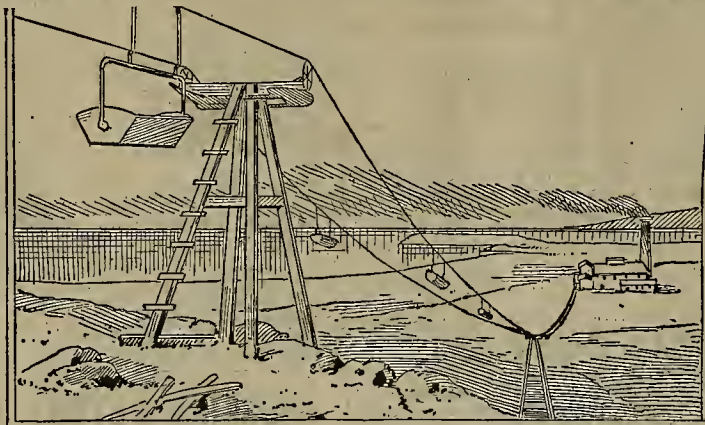
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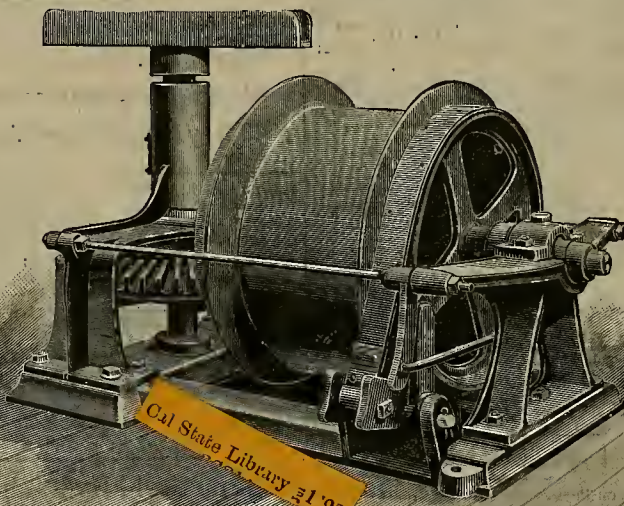
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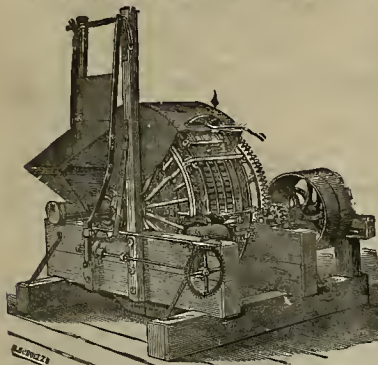
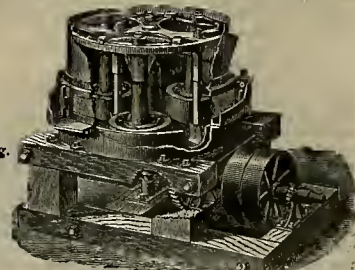
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VOL. LXVI. — Number 25.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 24, 1893.

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The State Mining Bureau Museum.

One of the very best and largest collections of ores, minerals and rocks in the United States is that of the California State Mining Bureau in the Pioneer Building in this city. The nucleus of this collection was made by the State Geological Society, which turned over what it had when the Mining Bureau was organized in 1880. Immediate and active steps were taken to increase the collection, which met with great success, and from that time the museum has been almost daily enriched by donations from all parts of the country. While some specimens have been purchased, almost the entire collection is the result of gifts. The most frequent individual donor is Mr. J. Z. Davis, one of the trustees, who has made quite extensive purchases, which he has added to the Bureau's museum. The miners throughout the coast have contributed whatever they found rare or interesting, and much has been obtained by exchange with other institutions. Under the organic law of the Bureau this museum must be maintained in this city, and it has become now one of the places which

tourists visit. Thousands of people go to this museum annually to get an idea of the mining products of California. The arrangement of the specimens is quite complete,

photographs. The smaller specimens are all displayed in handsome glass cases while the larger ones are placed upon shelves. The ores and minerals are arranged in

groups according to their nature, and there is also a grouping by counties. The whole is very convenient for the student or any one in search of information about the varied mineral resources of the State. This collection was largely drawn upon to make up the California display at the World's Fair.

The State Mining Bureau is now in a better condition than ever before to be a practical use to the mining community. The recently-appointed State Mineralogist, Mr. J. J. Crawford, is a gentleman of education and experience well-fitted to fulfill the duties of the office. He is determined to keep the practical features fully in view and to obtain all desired information for the working miners of the State. This will be systematized so as to be readily available on application. In preparing his reports he intends to employ those having special knowledge on subjects con-



VIEWS IN THE MUSEUM OF THE STATE MINING BUREAU, SAN FRANCISCO.

and they are all scientifically classified. The views given will convey a good idea of the general appearance of the museum, though only a portion can be shown in the

connected with mining and metallurgy, and is prepared to issue bulletins or monographs relating to the several branches of the mining industry in California.

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 CHAS. G. YALE, }

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San Francisco, June 24, 1893.

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Comment.

The famous old Eberhardt mine, in White Pine, Nevada, is closed down for the manager had no longer hope of finding ore in paying quantities as the upper levels are worked out and the lower levels contain nothing of any great value. The Monitor mine, also belonging to the New Eberhardt Co., Limited, of London, shows no large returns, though it is self-supporting. They have spent £20,000 to test the property though the estimate was £10,000. This did not give the shareholders special confidence in the directors or manager, so at a meeting the other day in London, they decided to quit silver mining altogether in Nevada and turn their attention to gold mining in South Africa. They are going to buy, for £75,000, the Thistle Reef gold mine, near Barberton, in the Transvaal. The directors were ordered to complete the purchase of the gold property, which consists of 20 claims with a total length of 3100 feet. The Eberhardt and Monitor mines in Nevada are to be sold. This will end the career of this once famous company on this coast. Like other London investors they are looking for gold mines and going to South Africa after them.

The metallurgy of the precious metals and of iron and copper is much further advanced than that of lead. Percy, the great authority on metallurgy admitted, after spending some years at the subject, that the chemical changes involved in the metallurgy of lead were still unexplained. We have recently in this country a fine and exhaustive treatise on this subject by Hoffman, entitled "The Metallurgy of Lead," printed by the Scientific Publishing Co. At the last annual meeting of the Royal Society, held in London, Mr. J. B. Hannay read an exhaustive memoir on the metallurgy of lead. Having been read before this distinguished body it is entitled to serious consideration though some very startling statements were made. Mr. Hannay proceeded to describe several new volatile compounds of lead the discovery of which gave the key to the solution of many of the difficulties which had hitherto beset the path of the investigator, and by examining all the furnace reactions of lead compounds in the light of those discoveries he was enabled, he said, for the first time, to present a true explanation of the metallurgy of lead, founded upon accurate knowledge. The process consisted in passing a stream of air through the lead ore in a Bessemer converter, by which simple means the whole of the ore was converted into pig lead, or litharge, or sulphate of lead, as might be required—thus enabling the manufacturers to make the product bringing the best price in the market. The oxidation of the ore supplied all the heat required to conduct the process, so that no fuel was required. The importance of this new process, Mr. Hannay declared, might be judged from the fact that not only was the whole of the lead obtained as finished products without loss, as against a 20 per cent loss by the old method, but every ounce of silver was separated and collected without any expense, no matter how little silver might be present.

The Anti-Debris Association and the Caminetti Law.

A few days since the California State Building at the World's Fair was formally turned over as complete to Governor Markham, as the representative of the people of this State. In accepting the building from the Commission, on behalf of the people of California, Governor Markham made a speech, in the course of which he said:

"While we are all proud of the financial standing of this Nation, California must be credited with furnishing the gold that saved this country in her direst need. And, sir, let me say right here that three-fourths of that gold was taken away without leaving to California a farthing to show for it, so far as her internal welfare was concerned; in fact, but a small portion of it was left to California for the exclusive use of Californians. Yet it saved the financial credit of the Nation and placed her in the prosperous condition she occupies to-day. The Nation is welcome to it, for California can still 'keep house' without it, and she is able to continue doing these charitable acts with her usual becoming modesty. Between the years 1843 and 1878 California produced for the use of this country \$1,185,550,000 in gold, and since 1878 \$220,000,000. In addition to this she has produced many millions in silver, all of which she has contributed to the financial interest of the whole country. It is safe to say that locked up in our hills to-day, awaiting the action of the Federal Government to aid in its extraction, we have as much gold as has already been taken out; and I am convinced that this Government can resort to no means so certain, so speedy, and so economical for furnishing it with gold to restore its depleted treasury as to permit hydraulic mining, now enjoined in the Federal courts, to be carried on in such a manner as not to destroy agricultural and horticultural interests."

At about the same time the Californians in Chicago were listening to their Governor's opinion of the gold mines of the State, and his suggestion for increasing the output of gold to help the Government, the Executive Committee of the State Anti-Debris Association met at our State Capital and passed the following resolutions:

WHEREAS, The State Anti-Debris Association is organized for the purpose of protecting the rivers and valleys of the Sacramento valley from the injurious effects of hydraulic mining; and, whereas, a measure has been passed by the Congress of the United States, known as the Caminetti bill, providing that hydraulic miners may apply to a commission for permission to mine if they can do so without injury to the interests of the Sacramento valley, and providing that any hydraulic mining contrary to its provisions is a crime against the United States.

Resolved, By the State Anti-Debris Association, that, for the purpose of placing on record its position on this question, it be declared:

1. The lands and rivers of the Sacramento valley must be preserved from injury by hydraulic mining from whatever source such injuries may come.
2. That this association rests its claims on the decisions of the courts and the Constitution of the United States, declaring that the interests of the valley cannot be injured nor its property ruined.
3. That the so-called Caminetti bill is a measure proposed by the miners and has never been accepted by the State Anti-Debris Association as a solution of the difficulty. That the only question in which this valley is interested is freedom from injury, and if the Caminetti bill accomplishes this result the association asks nothing further, but if, under this bill, the injuries that have done us so much damage in the past continue, we shall stand on our constitutional rights affording us full protection to our property, and we shall resort to the courts to secure this protection, if necessary.
4. That we propose in the meantime to take advantage of all the clauses in our favor prohibiting hydraulic mining, save under the provisions of this bill.
5. That we do not believe, from our experience in the past, that dams can be erected which will protect the rivers and the lands of the valley from injury if hydraulic mining is resumed, and we reserve the right to appeal to the courts if, by the operation of the said bill, hydraulic mining should be resumed to our injury.

Governor Markham was chosen by the people as chief executive of this State and represents the 57 counties of California. The State Anti-Debris Association is a self-constituted organization representing five counties of the State.

As between the two opinions concerning the resumption of hydraulic mining, it is easy to see which will have the most weight with the public.

Moreover, these preambles, resolutions and opinions can not well change the laws which have been made for the express purpose of rehabilitating the great industry of hydraulic mining. The Congressional law is still untried, but the special commission to carry out its provisions has been organized and is ready for work. It will be time enough to declare the law a failure when it is so proven.

The declaration of the Anti-Debris Association that it does not believe in the efficacy of dams to restrain debris carries no weight whatever, since none of the Executive Committee are engineers and their opinion on such a subject is of no value. When Congress appointed Commissioners to inquire into this matter they reported that the dams would restrain the injurious part of the debris. Thereupon Congress passed laws providing that such dams or restraining works could be built. Now that the Commission is ready to issue licenses to mine behind dams the Association comes out in opposition to both the law and the dams.

It should be remembered that this new law, known as the Caminetti Act, was passed by Congress at the special request of the Legislature of the State of California. The San Francisco Chamber of Commerce, Board of Trade, San Francisco Supervisors, and those of other counties, all passed resolutions asking Congress to pass this law. Now that it has been passed it is only proper that it should be given a trial. The Anti-Debris people themselves were supposed to be satisfied with the law, but it seems it does not look so favorable to them as first appeared.

The Association, however, has now placed itself on record on these resolutions. It has placed itself in opposition not only to Congress, the Legislature, the other public

bodies referred to, and to the engineers themselves, but also to public opinion, which is entirely in favor of seeing the miners increase the output of gold, if they can do it without injuring the rivers. The miners cannot do this without the dams, under the law, and the Association condemns the dams.

The action of the Association will be looked upon generally as that of a lot of fanatics who are able to see but one side of a question, and who have been fighting the miners so long that they do not want to "let up" even when the fight has been taken out of their hands. It will do no harm whatever to the mining industry of California. The question is now in the hands of a competent commission of engineers, and it is not probable that they will permit the members of the Executive Committee of the Anti-Debris Association or any other individuals to influence their opinion one way or another in the slightest degree.

Mill-Work, Concentrates and Tailings at Bodie.

There are some very interesting statements in the last annual report of the Standard Consolidated mine of Bodie. Manager Thos. H. Leggett is a very accurate man and details of operations are carefully presented in the report. The 20-stamp mill has run steadily the past year and has crushed 632 tons more than in the year previous at a cost of 36½ cents less, per ton milled, and with 41 per cent higher extraction of value. The total crushing was 16,336 tons, of an average value of \$19.92, of which \$17.93 was gold, the balance silver. They saved 72.45 per cent. The cost of milling per ton of ore for the year including all treatment of concentrates, vanner tailings, etc., was \$3.52½. The percentage of free gold obtained from the apron plates was 85½ and from the battery sands 14½ per cent. The consumption of quicksilver on the plates per ton of ore crushed was four-tenths of an ounce. They treated 123½ tons of concentrates in the year, the percentage of which in the original ore was two-thirds of one per cent. These were worth \$89.83 per ton of which \$58.97 was gold. Each stamp crushed per day 2.42 tons. The stamps drop 6 to 7 inches and 104 times a minute. They weigh 750 pounds each. The screens are 40-mesh punched tin. In this mill no quicksilver is fed into the batteries but its sands are amalgamated in pans at each month's clean-up.

The table giving a summary of the mill work for the year shows a total ore value of \$325,735.30, which is less by \$18,553.18 than the previous year. The bullion product, however, was but \$138.30 less than in that year, and the total milling cost, including cost of treating concentrates, vanner tailings, and all work done in the mill, was but \$57,884, against \$61,002 for the previous year. It is expected that this cost will be much further reduced during the coming year by the use of the electric power plant, the description of which, from the same report, was printed in the last number of the MINING AND SCIENTIFIC PRESS.

They treated by pan amalgamation 123½ tons of concentrates from the Frue concentrators with an average extraction of 81.6 per cent, or nearly 2 per cent better than formerly. The tests made the previous year were convincing as to the economy of this method of treatment, and it was then stated that a further yield would be obtained from the tailings of these concentrates (worth about \$20 per ton) after their exposure to oxidizing influences.

Last summer these tailings were plowed over several times and then amalgamated, 134 tons being put through the pans before winter weather froze up the tailings bed and covered it with ten feet of snow. A very base bullion was purposely made, barely 100 fine in gold and silver, but the extraction was very good for such material, averaging 67 per cent, and raising the total extraction on the original concentrates to 93 per cent, which is certainly as good as can reasonably be expected from any method of treatment.

The tailings from the concentrators after passing through two pointed settling boxes to get rid of the excess of water, are amalgamated by the Boss continuous pan system. They treated in this manner 11,370 tons, which yielded \$14,662.97, of which \$13,079.01 was gold. The cost of run was \$7,304.46 and profit \$7,358.51. They extracted per ton \$1.29 at a cost of 65 cents and profit 64 cents per ton. The percentage of extraction was 24.2. It was found that where the percentage of silver was high the percentage of extraction was higher, the silver evidently aiding the amalgamation of the gold.

Salt and bluestone have proved efficacious in aiding amalgamation in the pans, while the use of acid, advocated by Mr. M. P. Boss, was discontinued, as it was more expensive and gave no better results. While the work of this continuous pan system can hardly be considered good, the method is maintained in default of a better, and because it is cheap and shows a tolerable profit.

As stated in the last report, the Gold and Silver Extraction Mining and Milling Company in Denver, to whom

was sent a ton sample of these tailings, obtained an extraction of 46 per cent after twelve hours agitation of the pulp in a one-half of one per cent solution of cyanide. The Noble Mining and Milling Company also tested a 200-pound sample of vanner tailings last spring, and have since reported an extraction of but 38 per cent, adding that they "had never handled an ore from which they obtained so small a percentage of its assay value." Neither of these processes show a sufficiently higher extraction over that yielded by the present method to cover the royalty and the extra cost of either process, while they offer corroborative testimony as to the difficulty of obtaining high or even fair results from these clayey tailings. The method in use has at least the advantage of a known and positive monthly profit.

The Late Senator Stanford.

The accompanying portrait is one of the best ever made of the late Senator Leland Stanford, whose death occurred on Tuesday. He was a man of striking personal appearance. Daguerreotypes taken at the age of 20 show that even then he had a certain dignified bearing, belonging rather to a man of more mature years. A man of large physique in his prime, he grew more portly with advancing age, until during the past year or two he has had to confine himself to a rigid diet to keep down the ever-increasing flesh. His only exercise was riding, of which he was always fond, but for a long time he has not used fast horses or light "rigs," confining himself to a wide and very low open carriage, drawn by a pair of heavy, slow-moving horses.

Mr. Stanford was essentially a domestic man, and his wife was his constant companion. On the death of their only son they devoted themselves to the Leland Stanford Jr. University, founded and endowed as a monument to their boy. This endowment is one of the great public gifts of modern days, amounting to about \$20,000,000.

Always a lover of fine horses, Senator Stanford established the Palo Alto stock farm, and devoted himself to developing certain original ideas concerning the trotting horse, in which he was eminently successful. Horses bred by him brought wonderful prices, and were known all over the world. He bred both trotting and running horses on his farm, the two departments, however, being kept entirely separate and under different management.

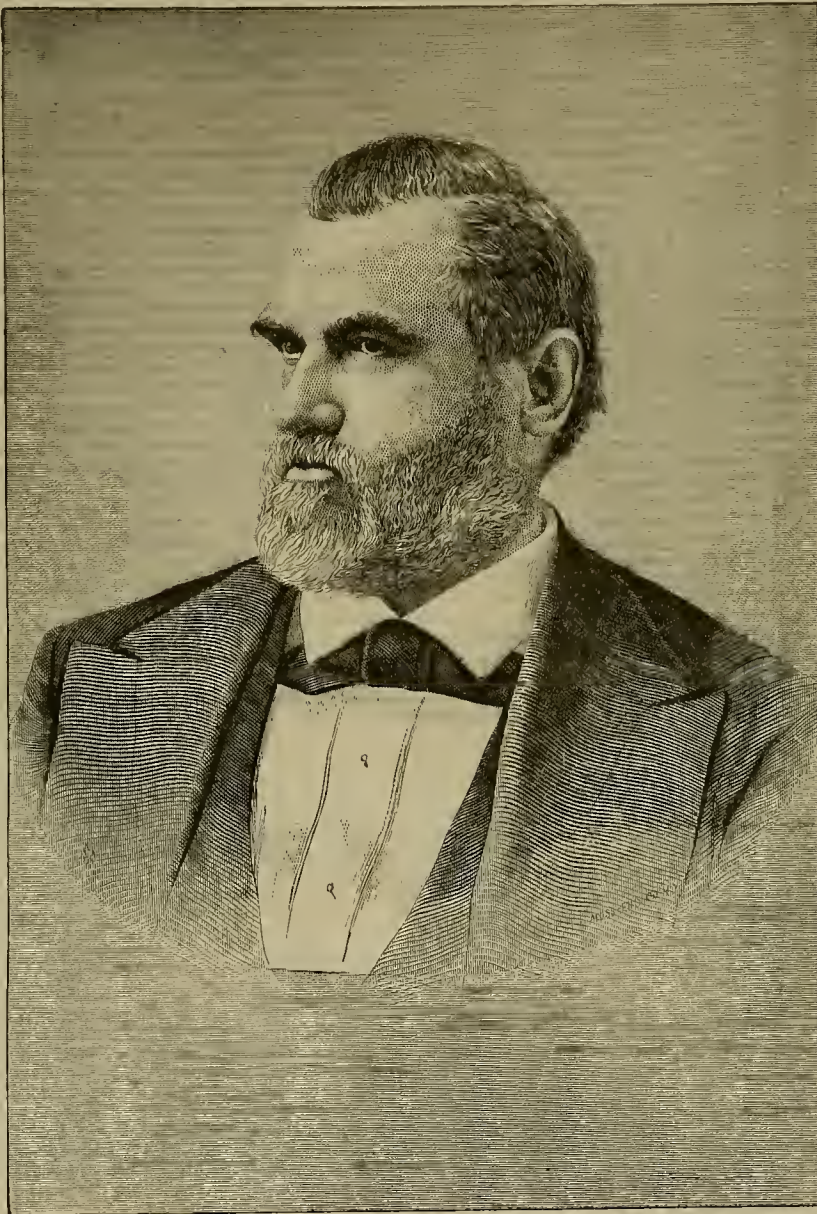
It has long been his habit, while living at his country residence at Palo Alto, to go daily in his carriage to the speed track and there witness the trials of his horses. Under the shade of a big oak called the "Governor's Tree," he would sit for hours criticizing the action of his horses, consulting with the drivers and issuing orders and directions. This was his great amusement and was followed to the day of his death. He would then drive through the university grounds, past the great buildings, back to his beautiful home, where he was always accessible to those who called. On this ride he daily passed a remarkable *memento mori* in the form of the magnificent tomb erected after his son's death, and over the door of which is carved his own name, that of his wife, and his son. The bulk of the great fortune amassed by this energetic and able man in the course of his active life will be devoted to the completion and maintenance of the university. This will be now under the management of Mrs. Stanford, and upon her death, devolves upon a hoard of trustees, already chosen and clothed with suitable powers.

No other Californian has ever occupied such a position before the public as has Leland Stanford. Coming here as an humble prospector and miner, then engaging in business as a merchant, he developed into Governor of the State, United States Senator, one of the great railroad builders of the age, president of a great system of railways, and, finally, the founder of a noble university devoted to the free education of the children of the land. In his death California loses her foremost citizen. No other name is so closely related to her material or political history.

LEAD seems to be following silver on its downward course.

PREPARING REPORTS FOR THE DERRIS COMMISSION. Messrs. Striedinger and von Geldern, civil and mining engineers, have become associated to make surveys and examinations and to prepare the required technical drawings, estimates and reports called for by the California Debris Commission in a circular issued June 8th, and published in the MINING AND SCIENTIFIC PRESS. These gentlemen are prepared to represent the petitioner in laying the case properly before the Commissioners. Mr. von Geldern has had considerable experience in river work in California and assisted the Briggs Commission in obtaining data about sites for dams, etc., and Mr. Striedinger is a mining engineer of experience. As the Commissioners prefer to have each case by a mining or civil engineer, these gentlemen have formed a partnership to represent such miners as may require their services in preparing the necessary papers and placing the case before the Commission.

THE FRIENDS OF THE MINING AND SCIENTIFIC PRESS are reminded that the close of the volume occurs with this



THE LATE LELAND STANFORD.

number, and that this is a good time to suggest to others that they should become subscribers. The index on the last page shows what a variety of topics have been treated. They cover most branches of mining, metallurgy, mechanics and practical science. Those interested in any of these matters can readily afford to place their names on the subscription list of the only weekly paper on this coast devoted to these specialties. Those who are already readers can greatly aid the paper by calling the attention of their friends to its merits and its usefulness. The mining community in particular should aid in every way in supporting a journal which devotes so much attention to the mining industry.

DIRECTIONS have not been given for the immediate resumption of work on the Bunker Hill and Sullivan mines in the Cœur d'Alene district, Idaho, as has been stated in some of the papers. The company has not yet settled its differences with the railroads.

Prospecting Drift Mines by Boring.

Mention was recently made in the MINING AND SCIENTIFIC PRESS that at the May Flower drift mine, on the Forest Hill Divide, Placer county, they were prospecting a cross-channel to find its center by means of a boring outfit. Since then we have learned some of the particulars from Mr. Felix Chappelet, manager of the mine. The boring is done by means of an ordinary artesian well outfit, the tools for which were made in this city. In addition to the derrick there are auger stems, sinker bars, bits, reamers, sand pumps, etc. The holes bored are six inches in diameter. One of them is 176 feet deep, passing through 26 feet of auriferous gravel, and a new one started is expected to go down 415 feet. This fourth hole is now down 120 feet and is progressing at a rate of over 10 feet per day. In one of the holes they made 25 feet a day for the first two days and sometimes go from 15 to 18 feet a day. The upper lava through which they are working is, however, rather hard.

This work is being done to find the center of a side channel. The 415-foot hole now being bored is intended for ventilation purposes in the Orono channel of the May Flower mine. The pipe will be left in, and at the bottom an elbow will be put in and the pipe led off 1000 feet to get an up-draught. It is an experiment, but they have great hopes of success. In this work double shifts of two men each are worked day and night, and it is not found to be at all expensive.

The May Flower mine is now quite profitable and is paying dividends. The last returns were \$17,583 from 14 days' run, representing gravel worth \$15.80 per ton—one of their carloads representing a ton. The tunnel is in 13,500 feet. There is then a raise of 45 feet from the tunnel to the gravel. The channel is worked from five to seven feet in height and 100 feet in width. The cars are run by horses, and there are two stations.

The May Flower is one of the principal drift mines in this State, and one in which there are very extensive developments. While the tunnel was being run, the assessments and expenses were very heavy, but that period has long passed, and they are now reaping their reward on the investment and labor.

The Eureka Consolidated is another drift mine, 13 miles above the May Flower, on the same Divide. It has a tunnel in 1645 feet and 210 feet in the channel running from the east stream to the west stream. This is under the same management as the May Flower, Mr. Chappelet being superintendent. The Board of Directors, organized a few weeks since, consists of Col. Herman Bendel, Felix Chappelet, Rudolf Herold, Daniel Hayes and D. M. Kent. Some of the shares are to be sold for working capital. This gravel can be washed, and no mill will be needed to prepare it.

Boring in the way described to find the channel center greatly simplifies the drift mining problems, for the miner can then tell exactly how and where to run, and there is no danger of getting a tunnel or drift too high for the best gravel, as has often happened. So far the experience has been favorable, the cost of

the holes being low and the work being carried on quickly.

THE owners of lead-producing mines are wearing long faces on account of the low price of lead. They say that lead cannot be mined at less than \$3.50, and if the quotations drop five cents lower they will be compelled to close down their works. The smelters also feel the depression, and they stand in the same position as the miners.

THE gold mining sections of California are overrun with men seeking work who have flocked there from silver districts in other States. As there were plenty of miners to carry on the work already there the new arrivals are generally compelled to remain idle or seek some other line of labor.

It is reported that all work has been suspended at Eberhardt, White Pine county, Nev., and the miners and their families have left that place for Taylor.

Coast Industrial Notes.

A CAR load of machinery has been shipped to La Porte, Plumas county, consisting of a complete outfit for a first-class saw mill for the Slate Creek Gravel Mining Company of that locality.

THE engine in the Navarro Company's lumber mill, at Navarro, Mendocino county, ran away the other day and the fly-wheel went to pieces, wounding three men, one of whom will die.

THE PLACER *Argus* says: L. I. Ogden went to Iowa Hill Saturday night last to put in running order at the Morning Star mine an electric dynamo to be used in lighting the works, tunnels, etc., of that property.

THE Denver Iron Works are now building a copper matte furnace for the reduction works at Reno, which will soon be shipped and put in place, and all ores containing gold, silver, copper or lead will be sampled and paid for at the works.

HENRY RYAN, a resident of San Diego, has been appointed Chief Engineer for the Los Angeles, Owens Valley and Utah Railway, and in a few days will begin the survey. The company's plan is to build the gap of 153 miles between Mojave and Independence.

THE mining outlook in White Pine county, Nev., is brighter than for a number of years. Twenty men were put to work in the Chinaman mine at Ely a few days ago, and the company which has taken hold of it will spend considerable money in developing the property.

THE engineers of the Southern Pacific Company are working on plans for a new steel bridge across the estuary at the foot of Harrison street, Oakland. It is proposed to remove the two old bridges that now span the estuary at Webster and Harrison streets. The new bridge will be a very large one and will do all the work of the two bridges. The present bridges do not meet with the requirements. The draws are too small, and a big vessel dare not take the chances necessary to get into the Brooklyn basin. They are only 80 feet wide in the draw and should be 120 to meet legal requirements.

A DESPATCH from San Diego says: A big transfer lighter, owned by the Development Company at San Quentin, has been bought by the New Padara Onyx Company and will be repaired and then taken to San Carlos landing. A force of men under Bell & Son will go down on the Pacheco with a supply of lumber. The Pacheco will tow the big lighter down on her next trip. The lighter is 140 feet long and 32 feet wide, and will be moored at San Carlos landing by heavy mushroom anchors, and Superintendent Foote of the onyx company expects that by the new arrangement the loading of onyx can proceed in any reasonable weather. Shipments of the stone will be at once largely increased.

IN accordance with instructions from the Bureau of Yards and Docks at Washington, D. C., there will be an extra large force of laborers taken in the Yards and Docks Department at Mare Island Navy Yard as soon as possible. This movement is entirely unexpected, and has more than ordinary significance attached to it from the fact that its advent is due to the recommendations of the Board of Officers who recently inspected the navy yard with Captain E. O. Matthew as president. It has been ascertained that the men to be taken on in consequence of the order mentioned will be employed in cleaning the navy yard of innumerable heaps of debris and other refuse scattered about the yard at various points and adjacent to the various shops.

CAPTAIN CHARLES MINOR GOODALL, Captain Edward Goodall and John L. Howard have returned from their inspection trip to the Ocoa bay mines in Southwest Oregon, which were lately purchased by Goodall, Perkins & Co. from the Oregon Coal and Navigation Company. The mines were found in excellent condition, but only enough coal is being taken out at the present time to supply a full cargo for the steamer Arcata. This was the first general inspection since the mines passed into the hands of the new owners. "When the steamer Arago, now having fine passenger accommodations built on her at the Union Iron Works," said Captain Goodall, "is ready to go on the route, which will be in about three weeks, we may make a change. She carries more cargo than the Arcata and the output of the mines will have to be increased sufficiently to give her a full cargo."

ANOTHER important enterprise in the way of water development is about to be inaugurated in Otay Valley, San Diego county, where Joseph A. Flint, in manner prescribed by law, laid claim to water flowing in Otay creek. About two years ago Flint constructed a dam across the channel above the named point and twenty feet below the water level at bedrock, and he now proposes to clear off the bedrock immediately below the old dam and strengthen the latter by adding forty feet more cement until the height of the present structure is reached. From then on work will proceed until fully 100 feet high, forming a reservoir of 65,000,000 gallons capacity, and affording a continuous flow of 5000 inches of water. The water thus obtained is to be used for irrigation, mechanical and domestic purposes in Otay, Ocoenta, Chula Vista, National City, San Diego, Coronado Heights and South San Diego, and will be diverted by means of a conduit eight feet wide by four feet deep, or pipe or ditch of equal capacity. A force of men has been put at work grading the road to connect with the main highway, and hauling the material necessary to construct the dam.

A DRAFT INDICATOR has been invented which is intended to be placed at either or both ends of a vessel for the purpose of showing at a glance to the officer of the deck how much water his vessel is drawing. It may also be set at any desired point, so that when a certain draft is reached a signal bell is automatically sounded, and continues to ring until stopped. This is effected through electric connections. The accurate working of the instrument can never, to the slightest extent, be affected by the rise or fall of waves.

Mining Notes from Siskiyou.

TO THE EDITOR:—Several San Francisco mining men have arrived in Yreka within the last week, who are on their way to visit mines in this and adjacent districts, and quite a number of prospectors from other sections of the country have passed through here on their way to the Salmon River country and other districts near by. Mr. C. W. Ayers, Mining Commissioner for the State of Oregon, passed through this place en route to his hydraulic mines on Shackleford creek, west of Quartz valley. Mr. Ayers states that this has been a very favorable season for placer mining in that section, and that in all probability the yield of gold from that district this season will be good. The Fort Jones Company are opening up their claim, which is situated a few miles north of Mr. Ayers' mines, on the same channel which runs through the range laying west of Quartz valley. Mr. H. C. Chester is developing his new property, which he purchased a short time ago on the east side of the valley. The ledge prospects well and Mr. Chester states that it promises to become a good paying mine.

The trail across the mountains from Etna to Sawyer's Bar has been open now some three weeks, but the road will not be passable for wagons for nearly a month yet on account of the heavy snowfall of last winter, which still covers the mountains to a considerable depth. The latest reports from Sawyer's Bar and vicinity are flattering, to say the least. A man who came over from there to-day stated that George Shaw, John Finlay and James Johnston struck a pocket on Jackass creek, five miles from Sawyer's Bar, three days ago, and that they have already taken out over \$1000, and that the pay still continues as far as they have worked.

It is also reported that a very rich pay chute has been struck in the Daggett mine, and that it is the largest and richest body of ore that has been struck in that camp for years. Alex. Parker & Sons have some good property over there that bids fair to make a good showing this season. The road across Scott mountain to Trinity Center is now open, several teams having crossed lately. Prospectors are coming in every day to the towns in Scott valley on their way to the mountain districts.

The mining districts embraced in Siskiyou county, which in the past, like southern Oregon, have been thought but little of by the outside mining world, are now attracting the attention they justly deserve of both capitalists and prospectors. The old prejudice against this section is rapidly passing away and confidence in its future mineral productiveness is fast taking its place. There is a large area of mineral country in this county that has been prospected but very little in the past, which, beyond a doubt, will become good paying districts at no distant date, and there are many opportunities for as profitable an investment of capital in this county as can be found anywhere on the coast to-day. Of course those localities have their drawbacks, like all other districts which are undeveloped, and seasons are not one perpetual summer's day, and you cannot drive a four-in-hand over a level macadamized road to all the mines, as some of the "natural-gas" capitalists and "whisky-bar" prospectors expect, and when they do not find them denounce the country and locality and pronounce it "no good," which expressions they themselves are the truest and simplest definition of. What Siskiyou county wants to develop its mineral resources is prospectors with brains and willing hands, who are not afraid of a little physical exertion, and capitalists with good sound judgment who are not afraid to back it with their money to prove their judgment correct, to their own profit and the benefit of those whom they employ. When that class of men become interested here the mutable and detrimental class, whose sole object seems to be to profit at the expense of others without any exertion or risk on their own part, will no longer be an injury to Siskiyou county's progress. Fort Jones, June 15, 1893. ALEX. QUARTZ.

Electric Locomotives in Mines.

"At the No. IV pit of the Mines de Marles, near Bethune, Pas de Calais, France, traction by electric locomotives has been applied experimentally in two galleries, driven in opposite directions, the northern one being new, and representing more favorable conditions in regard to inclination and humidity than the southern, which is considerably older. These have been chosen in order to arrive at the conditions under which the system can be most advantageously applied. The installation supplied by the Edison Co. is designed to work two locomotives capable of developing ten horse power with a current of 30 amperes and 400 volts, and utilizing 70 per cent of that given out by the dynamo. The engine, with cylinder of 400 millimeters (15½ in.) diameter, and 800 millimeters stroke, making 65 revolutions per minute, drives the dynamo by means of a belt at 840 revolutions. The main conductors on the shaft are insulated cables of copper, nine millimeters (0.35 in.) diameter, supported on porcelain knobs at intervals of 30 meters, which are connected with a switchboard at the pit bottom for turning the current either to the north or south gallery, as required. The conductors in the gallery are flange rails weighing 6½ kilograms per meter (13 lbs. per yard), which are hung from the roof and insulated by discs of india-rubber.

"The locomotive is a 15 000-watt series dynamo, mounted on an iron carriage with two axles, which are driven by an intermediate shaft and toothed gearing, the axis of the dynamo being parallel to the road. The current is taken from the conductors by two small carriages drawn by the locomotive. The electromotive force, and consequently the power of the engine, may be varied by a rheostat placed on the circuit, which acts upon the magnetic field of the main dynamo, so that it is very easily controlled. There is also a quick-acting disconnecting gear at either end for admitting or cutting off the current for the locomotive, as well as a reversing gear for changing its direction. The dimensions are: Length, 2.30 meters (7.54 ft.); breadth, 0.72 meter, and height, 1.50 meters. The weight, which was originally 1800 kilograms, being insufficient for the south gal-

lery, where the adhesion is deficient, it has been increased by the substitution of solid wheels and counterpoises to 2300 kilograms, which is found to give perfect adhesion and stability. The loss of current on the line is imperceptible.

"By useful industrial effect is meant the work moving the train apart from the engine. The effect of the moderator is only to limit the quantity of current, but not to regulate it. When closed, as on the first and fifth experiments, the current varies from 16 to 20 amperes; and when full open the quantity is the same, the difference of work being due to the voltage. In the fourth and sixth, with three-quarter open, there is a reduction from 30 to 25 amperes. This is due to the self-regulating character of the locomotive, which varies the expenditure of power with the work to be done. It is therefore a point of importance to keep the gradient of the line as uniform as possible, in order that the current may never exceed the maximum that can be safely borne by the rheostat. A comparison of the second, third, fourth and sixth experiments shows that it is better to increase the speed rather than the load. Electric machines work best at high speeds. In the third and fourth experiments the speed is seen to be increased 40 per cent with the same load, while the extra power expended is only 5 per cent, the maximum useful effect being obtained at a speed of 3.46 meters. This, however, is likely to be too high, except on straight roads of greater length, free from crossings and the conditions of the second experiment. The engine drawing 15 tubs at 2.50 meters, (9 kilometers per hour) speed will probably be more suitable. At this rate the engine could furnish in coal drawn 243 ton-kilometers in the shift of eight hours. With horse-traction, having regard to the bad state of the road, five horses (four at work and one relief) will be required to do the same amount of work. The two locomotives, therefore, when in full work, the only conditions under which they can be profitably employed, will replace ten horses."

Employees as Stockholders.

President Fish of the Illinois Central Railroad Company has issued, at Chicago, the following circular to the officers and employees of his road. It puts in practical shape a plan that has been for years talked about and has received considerable publicity:

An expression on the part of many of the company's officers and employees of a desire to invest their savings in the stock of the Illinois Central Railroad Company having reached the Board of Directors, they have thought that considerable saving in every department of the service could be effected by such a community of interest, and have authorized me to make to each of you the following offer, viz:

While the company has no stock for sale, it will assist any of its officers or employees to buy one share at a time at the fair market price, to be fixed when application is made, purchaser to pay for his shares in sums of \$5 or multiples thereof. Payments may be made to the treasurer, the local treasurer in New Orleans, the paymaster or the assistant paymaster. On the amounts so paid interest will be credited at the rate of 4 per cent per annum, and when the sum at the credit of any purchaser amounts to the price at which the stock was bought, he shall receive a certificate for his share of stock, and can then, if he wishes, begin the purchase of another share. The certificate of stock is transferable on the company's books, and entitles the owner to such dividends as may be declared by the Board of Directors, and to a vote in their election.

Any officer or employee making payments on this plan can have his money returned to him, with interest, on application, through the proper channels, to the head of the department in which he is employed.

Should the purchaser make no further payments during 12 consecutive months interest shall then cease to accrue on his payments, and the sum at his credit will be returned to him with the accrued interest on application.

In case a purchaser leaves the service of the company from any cause he must then either pay in full for his share and receive a certificate therefore or take his money with the interest accrued to the date of his leaving the service.

The foregoing does not preclude the purchase of a large number of shares of stock for cash.

Any employee desiring to so purchase should apply to either of the representatives of the treasury department named above, or to his immediate superior officer.

I sincerely trust that this offer will be accepted in the spirit in which it is made, and will be generally availed of for our mutual benefit.

THE company that erected the smelting works at Ketchum spent over \$1,000,000 in plant, mines, ores, supplies, etc., and failed to make the institution pay. A smelter was operated at Hailey in 1881-82, but it finally collapsed after its owners had sunk many thousands of dollars in the vain endeavor to make it pay. Another at Bellevue met with a like fate.—Hailey Times.

A. S. HALLIDIE, president of the Mechanics' Institute, went to Chicago last week, and will there arrange for the exhibit, in this city, next winter, of such articles now in the fair as the owners may desire to have the Pacific coast see. The exhibits will form a portion of a Mechanics' Institute Fair and will be shown in the pavilion or elsewhere, under the institute's auspices.

FIRESIDE MINING.—Since the closing down of the Standard mine the men have done a wonderful amount of prospecting. Tunnels have been driven, shafts sunk, lost ledges found, and old and abandoned mines thoroughly explored and opened up. Nearly all these gigantic enterprises, however, have been carried out around a hot stove in McAlpin's saloon.—Bodie Miner.

THE third annual Southwest Silver Convention and Mass Meeting of Miners will convene in Silver City on the 4th and 5th of July, 1893, at 9 A. M.

Progress in Metallurgical Industries.

Steel in the rough, says the New York *Sun*, is now sold at Pittsburgh at \$21.75 per ton of 2240 pounds—a fraction less than a cent a pound. In 1867 steel rails at the same mart were \$166 per ton; in 1872, \$112; in 1882, \$48.50; and to-day \$30. How has a result so surprising been brought about? Why is it that the United States last year manufactured 4,277,000 tons of steel against 3,679,000 tons produced by Great Britain, with promise that the interval between these two great rivals will widen rather than diminish as the years roll by?

First and chiefly, from the richness and vastness of the iron mines of this country, and the good fortune that many of them—especially in Pennsylvania, Alabama and Tennessee enjoy—enjoy in being contiguous to coal beds; and where, as at the mines of the Vermilion range, in northern Michigan, fuel is remote, water transportation charges to the furnace regions are nominal.

The cheapening of steel is in the main to be credited to the so-called Bessemer process, first devised by William Kelly, who, in 1847, at the Eddyville Iron Works in Kentucky, refined molten iron by a blast of air in an acid-lined vessel. The English inventor developed this principle of burning the superfluous carbon out of iron until only steel remained, with so much ingenuity and boldness that his name is indissolubly linked with the process. While that process is employed in manufacturing much the larger part of our American steel, the open-hearth furnaces devised by Siemens and Martin are steadily gaining in favor. The first of them to be built in the United States was erected at Trenton, in 1868, for Cooper, Hewitt & Co. Phosphorus in steel makes the metal brittle, and as many ores of iron, particularly those of the southern States, contain a notable percentage of phosphorus, it was an important discovery when in 1879 Mr. Sidney Gilchrist Thomas perfected his so-called basic process, by which such ores can be made into excellent steel. In England the bane becomes a blessing, the slag from a basic furnace, containing as it does much phosphoric acid, yielding a valuable fertilizer. Mr. Thomas' discovery was first applied in America to an open-hearth furnace in 1888, at the Homestead Steel Works of Carnegie, Phipps & Co. There are now six open-hearth steel works in this country. In the adaptation of a particular process to a special ore, carrying sulphur, phosphorus, or what not, a considerable economy is realized.

Of still more influence in the cheapening of steel is the introduction of machinery in mining both ore and coal, in getting out the limestone to be mixed with the coal and ore, and in saving manual labor at every stage of the manufacturing process. At the Carnegie Works in Pittsburgh is the most elaborate and costly mechanical plant in the world, one machine alone representing an outlay of a million dollars. Remarkable also is the steady gain in the efficiency of ore, coal and limestone, as furnaces have been increased in size and improved in design. The *Engineering and Mining Journal* recently gave some details taken from the accounts of a well-managed, typical concern. In 30 years ending with 1892 the coal required to produce a ton of pig iron had been reduced 37 per cent, the ore 20 per cent and the limestone 50 per cent. The saving in the manufacture of steel, of course, parallels these figures.

After the British and German mining engineers had met their American brethren in New York in October, 1890, they visited the leading iron and steel works in this country. What chiefly struck them was the pace at which operations were forced to a finish. Their observation on this point receives noteworthy proof in the mining department of the World's Fair. Among its exhibits are contours of the largest furnace in Great Britain, that at Newport, and the largest in the United States, that of the Edgar Thomson Works at Pittsburgh. The English furnace has a capacity of 30,000 cubic feet, produces daily 70 tons, uses 2308 pounds of coke to a ton of product, with 150 hours as the time of a furnace operation. The American furnace with smaller capacity, 18,800 cubic feet, turns out 271 tons a day, uses but 1863 pounds of coke per ton of product, and crowds an operation into 21 hours.

Beyond the causes metallurgical and mechanical which have cheapened steel are the irresistible forces of business. Competition has become exceedingly keen, and manufacturers these days have to be content with slim profits, and often with no profits at all. The bonanza years when steel works paid cent per cent are memories of the unreturning past. To-day such works must be advantaged by ample capital, and by executive ability of the first order, or go to the wall. As yet Great Britain, with its lower scale of wages, can make steel cheaper than the United States, but to this there is a significant exception in the forms of it manufactured for the architect and the engineer. The demand for structural steel on this continent is so vast as to bring down the cost of production below the British figures.

Because it is stronger and tougher than iron, steel long ago ousted iron from use as the material for rails. A steel rail lasts about ten times as long as an iron one. This, of course, has cheapened rail transportation, and so helped to cheapen steel itself by lowering freight tolls charged for hauling the ores and fuel needed to make it. As a material for machinery, steel not only wears better than iron, but can be run at higher speed. What this means in money saved in all the departments of the metal's application would require figures of astronomical audacity to express. And the end is not yet. Nickel alloyed with steel exhausts its tensile strength remarkably, as recent tests of armor steel abundantly prove. Let experiment in the preparation of this alloy come to success, as it undoubtedly will, and we shall see nickel steel enabling the architect and the engineer to take almost as long a stride ahead as when they discarded iron for ordinary steel. The time is at hand when bridge spans can be longer, towers higher, boilers, cars and engines lighter, and when machinery, driven quicker than ever, will last longer than it does to-day.

TELEPHONIC JOURNALISM is a feature of life in Budapest, and it is believed by the promoters of this novel

scheme that it will prove popular with the people. It is proposed to establish a system covering the entire city, dividing it into eight districts, all of which are to be connected to the central office. At the telephone exchange a regular newspaper bureau is conducted, the news of the city being collected by a regular staff of reporters and foreign reports being received through the regular telegraphic service. All of this is condensed into the briefest possible statement for publication in the *Telephonic Gazette*. At 9 A. M. each day the "editor" assumes his post at the central station, and begins to tell the story of the day's news. After the first budget is sent out it is repeated in order that those who may have missed anything can be fully informed. At 10 o'clock the "second edition" is ready and at regular intervals throughout the day these oral editions of the *Telephonic Gazette* are issued. In the evening lectures are reported, local entertainments are described for the benefit of the ladies, the latest attraction at the theaters are reviewed by the dramatic critic, and the young ladies are permitted to listen to a concert; "they can distinguish wonderfully well the touching pathos of the violoncello, the pearly staccatos of the violin, the sweet melodies of the flute, and the enchanting voice of the prima donna." The *Oriental Review* is authority for the statement that "by the aid of a single wire of the State telegraph line, our central station has been connected simultaneously with the telephone stations of Vienna, Graz, Brunn, and Trieste; and in all those cities the voice of the *Gazette's* editor has been heard—clear, sonorous, and with every shade of intonation." Western Electrician.

New Patent Center Line for Sinking Deep Shafts.

In anticipation of a paper which will shortly be read before some of the mining institutes of England, on "A Combined Center Line Apparatus for Sinking Deep Mines," which has been patented by W. Foulstone, of Barnsley, we are able to give in advance the following outline of the invention:

The apparatus is made of wrought and cast iron, the working parts being planed, turned and bored. The drum is made of the same material, and will take on 800 yards of center line, which can be put on as quickly at a depth of 700 yards as it can at 50 yards. The *modus operandi*, too, is so simple that an ordinary banksman can understand it in the course of a few minutes, whilst in the operation itself there is a saving in time of 80 per cent in putting on and taking off as compared with the present system. It can be adapted as a permanent fixture, being more reliable and safer than loose tackle as now used, and which has to be fixed daily or nightly by the banksman over the shaft top when the sinkers are working below. At times the wood bar with the pulley in it has been known to fall into the shaft or for the center line to run over, so endangering the lives of the sinkers when at work. The new center line, however, can easily be lowered from its position at the top to the bottom, and then pushed forward from one side to the center whilst the men are engaged in filling the hoppers or trunks, so saving all the time now used in fixing the loose bar with pulleys at the top and then having to lower the center line from the surface which under those circumstances frequently spins round for some time after the heavy weight is put on to straighten and steady it before it can be used. Then after being used it has to be drawn to the surface and the bar with the pulley or pulleys removed. The new center line, however, can be always hanging in the shaft with the weight on it and some 30 yards from the bottom, so that spinning is entirely done away with. When the winding rope is fixed to run in the middle of the shaft, the center line is lowered to the bottom and then pushed forward to the center, directly the hopper, or trunk, is raised to the surface to empty the debris. Whilst this latter operation is being carried out a man pushes the line to the center putting it in the desired position in the space of a few seconds, care being taken in fixing the apparatus in the line with the winding engine drawn and in the center of the shaft, a great advantage being gained in the setting out of the arches or porches in true line with that of the surface and with one common and unquestionable center. To do this, having first got the true center of the pit, this has to be followed up by drawing the line back to the side of it, so that by having the line accurately across the two points, the center line of arches or porches is obtained in a very few minutes. By the same means the sump frames can also be set out. It may also be said that where water accumulates quickly at the bottom of a sinking, there is often considerable difficulty in getting clear of it, and the placing of the center line is sometimes neglected, owing to the time occupied in getting rid of the accumulated water. It also happens at times that the shaft is sunk much too large in diameter, so as to be sure that it is sufficiently large without putting the line on, which requires the unnecessary space so opened out to be filled up with either debris, or brickwork, more particularly when the pit is walled-up from the surface, and so causing much additional work and unnecessary expense.—Colliery Engineer.

A MONSTER BLOCK OF ORE.—The directors of the Volcano Company, at a meeting held recently, decided to send out to the mines a force of 18 to 20 men to assist the present force in hocking out as large a piece of gold as the largest wagon will hold up. The block will be about 15 feet long and 6 feet square, weighing about 60,000 pounds. The vein from which this will be taken is 45 feet wide, with an unknown depth, and crops out on the surface for over a mile, hence a block 45 feet square by 1 mile in length could be had if there was any way of transporting it to the railroad. This one vein assays \$199 60 gold, \$81.40 silver and \$23 copper per ton. The company owns five other similar veins adjoining it and a veritable gold hill one mile north of it. The value of this ore block will be \$37,230. It will be a glittering beauty, showing silver and copper glance and native gold, intermixed with a blend of brown and green and red oxide. This large block of ore will be hauled to Sentinel on wagons, a town on the South-

ern Pacific Railway, 35 miles south from the mines, and shipped to the managers of the Arizona mineral exhibit at the World's Columbian Exposition at Chicago.—Phoenix (A. T.) Herald.

Trade Advertising Mediums.

When a daily paper has reached a circulation of 200,000, it has achieved a rare and remarkable triumph, for few indeed ever reach half that number. Yet the circulation of most trade papers exceeds that of any daily; not in the number of copies printed, but in the number of persons reached whom it is intended to reach. To illustrate our meaning, we may point out that the daily is read for its political and general information by those in every walk of life—by the farmer, mechanic, merchant, professional man and loafer. The trade paper is read only by merchants, for it contains little of interest to the general public. The ratio of merchants in every line of business, including small shops, etc., to the general population is about one to seventy. Making a division of merchants and separating those who deal in special lines from the general storekeepers, it is found that the ratio of the latter to the population is one to every ninety-five. We may select at random three counties in Great Britain with a total population of 66,000. The number of merchants in these three counties is 860, or one to every seventy-seven of the population. The number of general shop-keepers is 720, or one to every ninety-three of the population. Figuring on the circulation of a daily of 66,000, it will be seen that it reaches in that number 720 general store-keepers. Thus, a trade paper of 3000 or 4000 circulation reaches from four to five times as many retailers as a daily with a circulation of 66,000; and for a daily to reach the same number of store-keepers as a trade paper of 4000 circulation, it would require an issue of 300,000. And what daily fills the requirements? This fact is recognized by judicious advertisers for the retailers' custom; but there are scores of dealers and manufacturers who, when told that the circulation of a trade paper is 3000 or 4000, are inclined to ridicule its claims as an advertising medium, not knowing that a single edition of a trade paper with even the small circulation of 1000 copies reaches more persons whom they wish to reach than the issue of a daily paper of 100,000 copies. Those who may be surprised at this statement and imagine that our figures are incorrect, may easily convince themselves of their error by referring to any commercial agency reports. To reach the consumer the daily papers are a valuable medium; to reach the retail merchant the trade papers alone cover the field.—London Machinery.

The Monterey's Record.

The report of the Monterey's trial trip has been received and made public at the Naval Office. This official report, signed by Captain Howison as president of the board, says the vessel covered 51 knots on her four hours' full speed test, which is an average of 12½ knots per hour, and this notwithstanding the fuel was poor and the grate bars became clogged with glassy clinkers from the coal. The board says this is a very satisfactory run under the circumstances. The Monterey's boilers and engines were examined immediately after this run and no leaks were found. They were in perfect condition and working smoothly.

Immediately after the maximum speed trial and without stopping her engines the vessel started on her sea trial and was run altogether over 60 hours continuously with all kinds of sea and under all conditions of speed. Her guns were tested with both full and reduced charges. They showed no sign of weakness in any part, the recoil of the 12-inch gun was 44½ inches and 38 for the 10-inch.

The turning engines held the guns and turrets under complete control while loading, the ship at times having a roll of from 4 to 12 degrees. With the sea on the quarter the motion of the ship was regular and easy; with a moderate bow swell she showed the most and quickest action. In the trough of a short, choppy sea she followed the waves closely and shipped a small amount of water on each side. Steering head to wind and sea there was broken water fore and aft, but at no time in sufficient quantities to prevent working the guns and moving about the decks.

There was no defect found in the hull or fittings except some of minor importance, such as a defective capstan or leaky door. There was no defect in the boilers or machinery in any part, the guns and appurtenances worked properly and appeared to be sufficiently strong.

WASTE IN ANTHRACITE MINING.—The commission appointed to investigate the waste in anthracite coal mining in Pennsylvania has made its report. It is stated that at the Parish colliery, where all the small sizes of coal are saved, as high as 19 per cent of the total output of coal goes to the culm bank. This is not culm, but coal. In 1890 and 1891 the Clear Spring Coal Company sent all its buckwheat coal to the culm bank. At some of the oldest collieries the culm bank, with its valuable deposits of coal, is more than half of the total product. In the Panther Creek basin, from 1820 to 1883, 20 per cent more coal went to the culm bank than was marketed. It is estimated that since the commencement of mining 35 per cent of the total product, or 315,700,000 tons of coal and coal dirt, have been sent to the culm banks, which are, therefore, extensive deposits of fuel on the surface of the earth to be bought at a very low price, and which modern inventions in furnaces, blowers and grates have made of great value to manufacturers.

IN the contempt proceedings against S. M. Boyce and A. Westhall for hydraulic mining, Judge Gray of Marysville dismissed the case against the former and found the latter guilty, fining him \$500, which he will probably pay.

THE new camp of Vanderbilt, San Bernardino Co., now has 600 inhabitants. A wagon road from Vanderbilt to Good Springs has been contracted for to haul six tons of ore a day to Needles.

Mechanical Progress.

Boynnton Bicycle Road.

The members of the Thomson Scientific Society of Lynn recently entertained Hon. E. Moody Boynton, who talked to the members about his bicycle railway and its operation by electricity.

The question of questions at the present day is rapid transportation, said Mr. Boynton. Economy is secured by water routes where the cost is seldom more than one mill a ton per mile, but the demand for more rapid transportation seriously threatens the supremacy of the water routes. To-day Boston and the principal cities of Europe and America are as devoid of rapid transit as Egypt at the dawn of civilization. The light engine of Ericsson and Stephenson, which could run as fast as the average train now runs, has been increased in weight until we carry 20 pounds of timber and iron in palace cars and 10 pounds in crowded ordinary cars to every pound of paying weight of passengers carried. On long routes across the continent the weight and waste are so enormous that national railroad bankruptcy is threatened, unless the present extravagant system is changed. But in order to keep the track at high-speed efficiency and to obtain the necessary hoiler and engine power, weight has been increased, rails, bridges and roadbeds made heavier, until all the great thoroughfares are capitalized so heavily that they can be paralleled at one-tenth their cost and entirely swept away by electric rapid transit.

The capital of the railroads of the United States many times exceeds that of the national and savings banks. Any impairment will bring on a financial convulsion and possibly a revolution. I believe that the controllers are conscious that a great change is pending. These roads are banded together and all individual building of steam railroads has ceased. The use of the single rail for the passage of trains on standard gauge railways has been my especial study. We constructed near New York an experimental railroad out of an abandoned standard gauge road so that no practical engineering should go without attention. It was an old surface road elevated for one mile and surface for three-quarters of mile. The curves were so many that it had been abandoned and stage coaches substituted. At an expense of \$100,000 we repaired it and equipped it with my single rail bicycle engines and cars, and in three years we have run 27,000 trains, carried 100,000 passengers safely, smoothly and at three times the speed of standard gauge engines. With an expenditure of five pounds of coal per mile we move three cars containing seats for 324 passengers. I used veneer and steel in the construction of the cars, each of which contains 18 compartments seating six persons each. They are entered from the side like a hack. One brakeman opens and closes the doors of two cars by a lever without leaving his position. Not an accident of any kind has taken place in the three years. These cars are stiffer and stronger than any others, on account of their compartments and special construction with steel and veneers. Where the sheets of the veneer come together in the compartments no strain is observed in stopping the train when running 70 miles an hour. There has been scarcely any wear and tear of the working parts when rounding the sharpest curves. Electricity should be used. If electric energy from coal is between 40 and 50 per cent if applied electrically, and 80 per cent by steam, the difference will be more than made up by the saving in weight. My largest engine contains an eight foot driving wheel with a 14 inch stroke. Nearly two strokes are made to the present ordinary 11-ton engine's one. My first bicycle electric motor car has wheels five feet in diameter, turning on spindles, one at each end of the car, which is sharpened to cleave the atmosphere. The field and armature are in and on the wheel and it can turn the sharpest curve. If a road of sufficient length were completed the first motor could run at the rate of 200 miles per hour.

Smokeless Combustion of Coal in Europe.

Recent reports from Germany convey that the difficulty of burning coal without the production of smoke has been overcome, and that the demonstrations leading to this result have excited much interest among several large enterprises, including the North German Lloyd and the Hamburg American Packet Company, while, it is said, the Vulcan Forges of Stettin have actually adopted the new system. This invention differs from all others which have been employed for the purpose up to the present time, and it is

styled "the automatic and smokeless combustion of powdered coal."

The process is a simple one, says *Invention*. The fuel, instead of being introduced into the fire-box in the ordinary manner, is first reduced to a powder by pulverizers of any construction. In the place of the ordinary hoiler fire-box, there is a combustion chamber in the form of a closed furnace lined with firebrick, and provided with an injector similar in construction to those used in oil-burning furnaces. This chamber has two openings—one on the center line and in the place of the usual furnace fire-door, the other on the opposite side. The orifice of the nozzle is placed in the latter aperture and throws a constant stream of fuel in the chamber. This nozzle is so located that it scatters the powder throughout the whole space of the fire-box. When the powder is once ignited—and it is very readily done by first raising the lining to a high temperature by an open fire—the combustion continues in an intense and regular manner under the action of the current of air which carries it in. This current is regulated once for all by the amount of powder required for the production of the heat led off to the boiler and the evaporation of the weight of steam demanded.

The powder is stored in a box, whence, by means of an ingenious arrangement, the air under pressure carries it to the fire-box. Numerous applications and experience have, according to continental journals, established this practice on the South Eastern railway of Russia and the steam vessels of the Caspian sea.

In the system under consideration, the coal, so that it may be drawn out and carried along by the steam or air under pressure, needs to be finely pulverized, and that is why it is explained that success has been attained in the use of coal which was already finely divided.

The air and fuel are, therefore, intimately mingled in the furnace. It is urged that in this process the combustion of the fuel is complete, for each particle of coal in suspension in the fire-box is in contact with the oxygen required for its consumption, which is thus proved to be a state of affairs far less difficult of attainment than was hitherto considered.

It is also explained that the air entering the combustion chamber may be first heated to a high temperature by utilizing the heat of the escaping gases in the stack. This air may also be mingled with a jet of steam, which decomposes into hydrogen and oxygen, the hydrogen serving by its combustion to assist in the elevation of the fire-box temperatures. By this system the admission of cold air is avoided and a constant temperature can be obtained. It appears that in case of accident the fire can be instantly extinguished by actuating the valve, which cuts off the supply of fuel. High chimneys are no longer a necessity, as the fire-box is operated under a sort of forced draught.

If we can accept the reports issued describing the results obtained, the system must be a valuable discovery. Works situated in the centers of densely populated localities will find obvious advantages in its use. Even if it be less economical than claimed, the very fact of its suppression of smoke should lead to its wide adoption.

Goats for Puddling a Dam.

We recently copied from the *Engineering News* a paragraph describing the use of goats for puddling the reservoir dam at Santa Fe. Mr. J. M. Howells, C. E., writes as follows to the *News* concerning the subject:

"The paper read by Surveyor-General Hobert, before the American Society of Irrigation Engineers, gives the time occupied by the goats in puddling as from 12 M. to 1 P. M. and 5 to 6 P. M. This was correct when the paper was read, for at that time several hundred goats were proposed to be used, and not 115 as mentioned.

"It was subsequently found that as the travel of the goats did not interfere with the teams, it would be more convenient and economical to use a less number of goats and keep them at work all day. As a result of our experience, we find that 115 goats by constant use would do well the puddling for 30 wheel scrapers averaging about 14 cubic feet per load or about 500 feet haul.

"The material was first spread while dumping, next leveled in a 3-inch layer by dragging a beam, next sprinkled with a sprinkling wagon, and then puddled by the goats. The puddling was thoroughly done in this way, and the surface left just rough enough for good joint with the next layer.

"As goats in this arid region are a dry hill-side animal, I feared such a radical change in their habits as keeping their feet muddy all day would bring on foot disease. No lameness had appeared among them up to six weeks ago, and I have had no word of

any since; it seems likely their hardness will carry them through.

"When goats were first put to work they tired easily, and were able to stand it but a part of the day; we learned this was upon account of the scanty range upon which they had fed, having to rely mostly upon browsing the juniper brush. A few days, however, of feed on peas and refuse hay brought back their accustomed good spirits. And after their day's work was over, they would hutt each other around the corral with the enjoyment characteristic of this singularly precocious animal."

Scientific Progress.

Stars of the Milky Way.

A *Sun* reporter recently spent an evening in St. Louis with Prof. E. E. Barnard, of Lick Observatory. Prof. Barnard is the discoverer of sixteen comets, and he bears the reputation of being the keenest of all the eagle-eyed searchers of the heavens. He is yet a young man, and he is enthusiastic in the work he is now pursuing—photographing the Milky Way.

Original investigators are usually very careful to make no statements concerning their work which facts do not fully bear out, and Prof. Barnard was no exception to the rule. When asked how many stars there were in the Milky Way, he replied: "The old text books said the Milky Way probably contained 20,000,000 stars, but I can photograph more than that number in a five minutes' dry-plate exposure. We estimate pretty accurately that the Lick telescope shows 200,000,000 stars. Of course, you know that photography catches stars which the telescope does not reveal. The greatest revelations now coming to astronomers come along the line of stellar and nebular photography. Modern methods in astronomical photography are such as to give us a quite clear delineation of the Milky Way, nebulæ, and comets. Some of the negatives I have in this little case show us the growth and changes of comets and nebulæ in a most satisfactory way."

Prof. Barnard then exhibited three photographs of the comet which he discovered in October. The first showed the nucleus quite diffused and the tail split in two sections. A negative made twenty-four hours later showed the head contracted, the tail shorter, and the sections closer together. Strangely, another photograph forty-eight hours later showed the tail elongated and the head condensed, giving evidence of a growth of many millions of miles in the tail in the two days which elapsed between the photographs.

"How many nebulous groups have you discovered in the Milky Way to date?" he was asked.

"I have been at work on my photographs about two years, and I think I have found forty or fifty groups of nebulosity supposed to belong to the infant stages of world-making, according to the nebular hypothesis."

Prof. Barnard did not like to make an approximate statement of the number of stars in the Milky Way. Finally, however, he said:

"I do not believe I have half finished my photographs, and it will require three years to complete them, for it is tedious labor, which often requires many hours' exposure, at favorable times, aided by a delicate manipulation of fine instruments. At the conclusion of my labors I believe an estimate may be made, and I think these little specks will prove to be say 500 millions of stars. You must know that no known clock-work will move the instruments so as to keep a given star in one position, so the fingers must be used to adjust the camera. Furthermore, we have to wait long for just the proper conditions for this work."

Prof. Barnard's plates are the most complete and satisfactory ever undertaken, for, besides being an eminent and competent observer, he has been a photographer from childhood. Making photographs of the Milky Way interests him more than any other work he has ever undertaken, and the work has been fruitful in unlooked-for directions. It was while doing this labor that he noticed certain displacements and lights which led to the discovery of many comets. The photographs of stars so large that ours is a grain of sand on the infinite shores of matter in comparison do not show larger on his plates than the thousandth of an inch in diameter, while movements of mighty orbs at the appalling velocities of hundreds of miles per second are slower in the telescope than the creeping of the hour hand on a small clock's face.

"Yet a vaster thought," said Prof. Barnard, "is that the Milky Way, thickly studded as it is with giant stars, and re-

splendent with varied lights and magnitudes, show that every star has back of it a luminous background of possibly millions of suns; and the black spaces on my negatives, which presumably show the vault of empty space, in reality represent billions of miles of the universe, which a longer exposure of the plates would probably people with infinite suns, each with its train of planets, surging with the throb of life and responsive to the control of law."—New York Sun.

Earth Currents.

A very interesting phenomenon, and one that has received considerable attention from various experimenters, is that of earth currents. A variety of theories have been advanced as to the cause of these currents, careful study has been made of their nature and strength and the frequency of the intervals at which they manifest themselves, and it has even been proposed to store up their energy for commercial use. J. Kennedy Gibson has made a series of interesting experiments upon the subject on one of the Java-Australian cables. His observations differ in many respects from those made in other quarters of the globe. In all his experiments the diurnal variation seems to be fairly uniform, the times of maxima and minima agreeing in a marked manner. On the Atlantic cables it has been found that there are two complete alternations in 24 hours, while on the Java-Australian cable there appeared to be but one of about 13 hours' duration, while during the remaining period the currents are weak and variable. The slope of earth-current variation does not seem to coincide with that of the tidal lines. Mr. Kennedy is not inclined to accept the hypothesis that the earth-current variations are due to either the sun or the moon individually, but suggests that they are more probably due to the combined influence of the sun and the moon, and are also affected by thermometric and barometric variations.—Electrical World.

Photographing in Colors.

Photographing in colors is now a *fait accompli*. The most successful negatives have been obtained by the Messrs. Lumiere, who employed the method of M. Lippman. "The pictures that you behold in these negatives," said M. Berget, in a recent account of the experiment, "are like aquarelles. Here is a cluster of flowers—roses, violets, jasmies—which appear in their proper colors, their real colors, with all their infinite delicacy of multiple and various tones. Everything is there—the green, the white, the blue, the red, the rose and the violet, with their subtle, velvety hues; everything is there but the fragrance of the flowers. Here, again, is a bit of park scenery, with a sky of exactly rendered blue, with graveled pathways which one distinguishes with perfect clearness from the earth graded for the green sward; here is a ravishing little cottage, all bathed in sunshine—and what sunshine!—and here a vista under the trees, made of sombre greens and light greens, the lights deliciously distributed and the whole view giving the sensation of nature itself." Until the time of exposure is accelerated, portraits in color will not be popular. With the gelatine plate now used, from twenty-five to thirty minutes are required, and there are very few who would care to remain motionless for a half hour in the brightest sunlight to see ourselves as others see us.

ELECTROLYTIC SEPARATIONS.—The London *Electrical Review* gives a short summary of recent papers on this subject. Dorrschach (*Chemiker Zeitung*, v. 16, p. 118) states that from an ammoniacal solution of copper the metal is deposited without contamination, even though silver, bismuth, antimony, arsenic or tin are present; mercury and cadmium, however, may interfere; if the action is too prolonged, nickel, cobalt and tin may be deposited. Smith (*American Chemical Journal*, v. 14, p. 435) states that iridium is not precipitated by the current if there is an excess of phosphoric acid or an alkali phosphate, whereas palladium and platinum separate readily. Smith & Wallace (*Journal Analytical and Applied Chemistry*, v. 6, p. 87), state that in potassium cyanide solutions gold is readily separated from arsenic, molybdenum or osmium, and from wolfram if dissolved in the potassium cyanide, but if dissolved in potash the separation is unsatisfactory; osmium separates readily from cadmium, silver and mercury in a potassium cyanide solution, and cadmium from nickel if potash is present. Rudorf (*Zeitschrift Angewandte Chem.*, 1892, p. 695) gives methods for the separation of various metals. Medicus (*Ber. d. Deutsche Chem. Ges.*) states that lead may be separated accurately and rapidly from galena if

dissolved in hydrochloric acid, then in potash, and precipitated as carbonate by means of carbon dioxide, then dissolved in nitric acid and electrolyzed.

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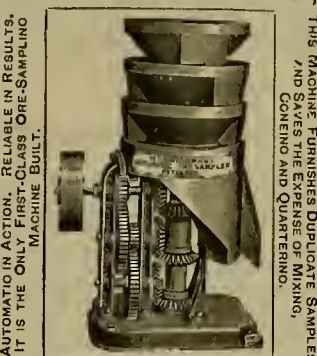
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Electricity.

Electric Propulsion by Accumulators.

The Company of Tramways of Paris and the Department of the Seine has, for a few months past, been operating its Saint Denis lines by means of electricity furnished by accumulators. This new application of electric propulsion by means of accumulators is more important than any of those that have preceded it, says the *Scientific American*. The installation of the Saint Denis depot was made in view of the exploitation of two lines, each about 9250 meters in length. Both start from the cross-roads of Picarde, at Saint Denis, one running to the Madeleine and the other to the Opera house.

The program laid out for the constructors of the motors and the electric accumulators was as follows: To replace, upon the above-mentioned lines, the horse cars by self-moving ones, capable of accommodating 50 passengers and two employees of the company. The mean speed demanded for a full car was 12 kilometers per hour, with the possibility of reaching 16 outside of Paris, and 6 at a minimum upon heavy gradients of from 38 to 40 millimeters per meter. The company, moreover, desired that it should be possible that the electric cars should haul another car. The daily trip estimated for each car was 135 kilometers. Finally, the weight of the accumulators, including all the accessories, was not to exceed 2800 kilogrammes. All these conditions have been fully realized.

The body of the car rests, through the intermedium of rollers, upon two single-axled trucks, carrying bolster pins and connected with each other by a spring coupling that permits the axles to converge on curves and brings them back to parallelism on a straight line. Each axle is actuated by a dynamo-electric machine by means of two sets of gears. The ratio of the angular velocities of the motor and axle is 12 to 1.

The electric motors are bipolar, of the Manchester type, with Gramme ring armatures. The brushes consist of four blocks of carbon placed at right angles with the surface of the collector. Each machine, at a velocity of 1300 revolutions, is capable of developing a power of 10,000 watts under a difference of potential of 200 volts. Under such circumstances, the rendering between the terminals of the dynamo and the axle reaches 73 per cent.

The trucks are provided with the Lemoine winding brake. The battery, which is placed under the seats of the car, consists of 108 elements of 11 plates, contained in ebonite troughs. The plates are 0.2 meter in length, 0.2 meter in width, and 0.006 meter in thickness. The total weight of the active material of each element is 17.5 kilogrammes. These 108 elements are distributed among 12 wooden boxes, 6 on each side of the car. The nine elements of each box are grouped in tension, and the poles of the small batteries thus formed each ends at a strip of copper fixed to one of the lateral sides of the box. Plates of brass, connected with the circuits of the dynamos through a coupling commutator, are mounted by springs upon the wooden supports in the car. The introduction of the boxes between these plates, upon which slide the strips of copper, establishes a connection between the elements of the battery automatically.

The charging of the batteries is done upon benches formed of tarred planks, supported by bricks, from which they are separated by glass insulators. These benches carry spring contacts, similar to those of the axles of the cars. The battery, placed upon the charging bench, has all its elements grouped in tension. The accumulator hall now comprises 24 battery benches, each of which is connected with the distributing board of the charging current by a special circuit containing an amperemeter and an indicator of the direction of the current, and, upon each pole, a circuit breaker and an interrupter. The transfer of the batteries from the benches to the cars is effected through trucks running upon tracks alongside of the benches and the side tracks. The platform of the truck is raised or lowered by means of a screw and winch, so as to bring it exactly to the level of the interior of the car or to that of the charging bench.

The current is furnished to the accumulators by three Desrozier dynamos, each actuated by a Corliss horizontal condensing engine of 125 horse power. These engines are supplied by three semi-tubular boilers. The dynamos, at a velocity of 600 revolutions, furnish a current of 230 amperes under an E. M. F. of 260 volts. They, as well as the circuits of the batteries, are grouped in quantity. The charge is made at a constant po-

tential. The duration of the charging is six hours for a battery that has furnished its whole capacity, which is 230 ampere-hours. The rendering of the batteries in energy is 70 per cent.

The necessities of the exploitation require the possibility of running at various speeds. This desideratum is realized by modifying the coupling of the battery elements. The battery is divided in the car into four parts, or sub-batteries, each including three boxes, say 27 elements in tension, that correspond to a difference of potential, in closed circuit, of about 50 volts. By means of coupling commutator within reach of the motorman, three different couplings may be obtained. The speed of the car varies, in passing from one coupling to another, in the ratio of 1 to 2.

The motors of the cars are normally associated in series, but it is possible, through the commutator, to couple them in quantity so as to obtain a greater speed or to develop a greater stress. The commutator permits, also, of changing the direction of the car by reversing that of the current in the induction circuit of the motors, and, in case of damage, of suppressing one of the motors. A single motor is capable of continuing the service with a slight diminution of speed.

The service of each car is assured by two batteries, that permit of four or five trips being made without recharging. In the latter case, the battery furnishes a motive power for a trip of 55 kilometers. The duration of a trip, including stoppages, is 55 minutes. The weight of the car, complete, is 13,500 kilogrammes, 2600 of which are for the battery and its accessories and 3500 for the passengers. The mean tractive stress is 12 kilogrammes per ton.

Experiments with High-Frequency Discharges.

Mr. A. A. Campbell Swinton, the author of a recent paper in the *Philosophical Magazine*, has succeeded in passing through his body, from hand to hand, sufficient electricity to bring the filament of an ordinary five-candle power 100 volt incandescent lamp very nearly to full incandescence, and found that practically no sensation resulted from the transmission. The apparatus used consisted of a large induction coil coupled to three Leyden jars whose disruptive discharge excited the primary of a high-frequency induction coil. The secondary of this induction coil had its terminals in two brass balls, to which the wires were led through glass tubes filled with oil. One of the terminals may be grasped with impunity, and hardly any sensation is felt; and while thus in contact sparks will pass to any conductor placed near enough. If the free hand, holding a metal rod, be approached to the terminal of an incandescent lamp, as described above, whose other terminal is earthed, the lamp is first filled with phosphorescent light, then sparks pass and the lamp glows, and on making contact the lamp reaches very nearly its full incandescence. The author believes that this result is due, not to the passage of the full normal current through the body (its effect being not felt owing to the exceedingly high frequency), but to the fact that the amperes taken are actually much less, owing to the crowding of the current to the outer surface. The virtual resistance is thus very high and increases the voltage of the lamp; and thus a much smaller current enables the lamp to receive enough energy to produce incandescence. This explanation is confirmed by the fact that while the lamp was glowing sparks passed between its terminals, thus proving that a very high P. D. existed of the order of thousands of volts.

Other curious results were obtained. If the connection from the secondary coil to the lamp were made by a wire, instead of utilizing the body, the lamp reached more than its normal candle-power; thus showing that the body offers resistance to the passage of the current. To estimate this resistance the thumbs of the connecting man were approached, and sparks about one quarter inch long passed, showing a P. D. of some thousand volts. If the hands were brought into contact so as to short circuit the man, the lamp became appreciably brighter. Placing the body in parallel with the lamp between one terminal of the high frequency coil and earth, the lamp was reduced to less than half its brilliancy, the two impedances being apparently about the same. If one terminal of the lamp were connected to the coil and the other were touched by a piece of metal held in the band of the insulated or uninsulated operator, the lamp glowed. The effect in this case is due to the capacity of the gentleman in question. These experiments were made with the other terminal of the high frequency coil free; if it were earthed or touched by another operator, the brilliancy of the lamp was diminished. Again, the in-

candescence was diminished if the lamp was connected directly across the terminals of the lamp; and if the operator occupied a similar position the sensation was quite unbearable. The author concludes, therefore, that capacity has much to do with the results obtained, and that the physiological effects of electric currents are not necessarily proportional to their heating power.

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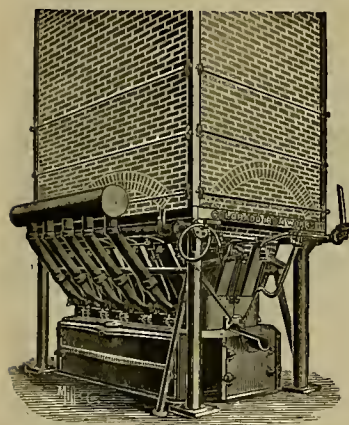
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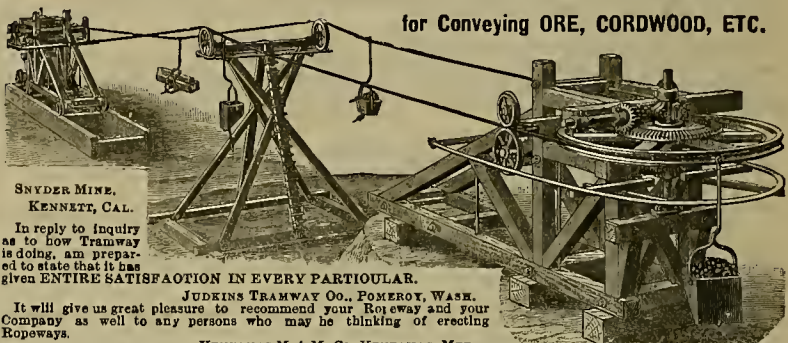
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CHEMICAL LABORATORY,

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Useful Information.

Skim Milk for Manufacturing Purposes.

An English scientific journal of recent date directs attention to the utilization of skim milk for manufacturing purposes. Attention was first called to it in connection with the "Rivers Pollution Act." A large firm of cheese makers were in the habit of sending all the whey and skim milk which could not be used for pigs into the nearest river, and the prohibition of this practice has led to invention for its utilization.

One invention is a method for making all kinds of buttons, door knobs, electric lighting furniture, umbrella handles and many small articles from lactite, a substance made from skim milk. In this process the milk is heated to 85° or 88° F., and to every 58 gallons is added about four ounces of rennet. As soon as the milk is coagulated, the curds are washed once in warm water and then put into a masticator, which is warmed to about 150° F. In the masticator should be placed about 2½ pounds of borax, with about four pints of skim milk. When the masticator has been run a short time until the curd is almost converted into a solid mass, about two pounds of starch (preferably arrowroot) are made into a paste with some of the milk or whey, and three ounces of alum are also added, and the whole mass well incorporated.

The masticator is run for about an hour, and then three pounds of acetate of lead dissolved in half a gallon acetic acid are added to the mass, and carefully worked in, and when the mixings have been well made the mass is taken to the hydro-extractor, and then put into a hot press until it is properly set.

A large factory was fitted up near Manchester, England, for the manufacture of lactite, but it is said that up to the present time it is not a financial success. The lactite, when so prepared, will keep for any length of time.

The second process which is being experimented upon is to convert the skim milk or whey into a portable article of food. It is impossible to send skim milk or whey at a profit to distant towns, and some simple process by which farmers could get rid of the water at a small cost, and leave a residue rich in nitrogenous matter, is a thing very much to be desired. Lactoserin, the name given to this product, is prepared in a variety of ways as food for man, cattle and poultry. Roasted it can be used for mixing with cocoa instead of starch.

The manufacture of these products should possess great interest for the farmer, for it will enable him to turn to marketable value what has been too often a waste product. The dry curds are obtained from skim milk in the same way as in the production of cheese by adding rennet. The curds are pressed and ground and then dried in a drying oven. It has been estimated that the cost of manufacturing dry curds will not exceed more than about one farthing a gallon for the skim milk used.

APPRENTICES.—Boys are no longer apprenticed as formerly to a master who takes them into his family and teaches them a trade in all its branches. In the old days the master was responsible, legally and morally, for his apprentice's advancement, worked beside him in the shop, and saw to it that he acquired full and accurate knowledge of his craft. The introduction of machinery and the subdivision of labor have been working together for years to make intimate supervision and instruction of this kind impossible. The master mechanic, instead of presiding over a small shop, and being a master of all branches of his trade, has become, in many instances, the master of merely a single branch of his trade. But whether master of whole or part, he does not work with his men, and can give no personal attention to an apprentice. It has come about, therefore, that boys are hired to do the menial work of the shops, to sweep and clean, run upon errands; and, as part payment for his work, they are permitted to pick up only as much knowledge of the trade as the good nature of the foreman and journeymen will permit. Of system and thoroughness in the knowledge thus picked up there is none. From the menial nature of the employment, self-respecting boys regard it as degrading, and consequently refuse to enter upon it.—June Century.

INSECTS do not breathe through the nose and mouth. Down the body runs two main pipes. These pipes send out branches to right and left like a network, extending to the extremities of the body, even to the ends of the antennæ and to the claws. Each

main tube receives the external air through nine or ten spiracles or breathing holes, placed at intervals along the sides of the body. The spiracles are made water-tight and dust-tight by a strong fringe of hair which completely guards the entrance.

BAROMETER FOR MINES.—Dr. Carlo del Lungo has constructed a barometer of high sensibility, which would be of great use in coal mines. According to a description in the *Rivista Scientifica Industriale*, the apparatus is composed of a vertical tube 20 mm. in interior diameter and about 1 m. in length, the bottom of which is curved in the ordinary manner, the opening at the top, however, being furnished with a steel peg screwed in an iron collar attached to the tube. A long capillary tube, 1 mm. in diameter, is fixed at right angles on the large tube, a little above the curved part, and terminating in an open receptacle. The quantity of mercury is regulated so that the meniscus of mercury presented itself in the middle of the capillary tube. The slightest difference of atmospheric pressure will cause the mercury to rise and act on the capillary column. A fall of pressure is indicated by the inverse movement of the column. In this way the increase or decrease of the mercury in the large tube is augmented according to the section of the tubes, and in this case as 400 is to 1. A variation of 1.400 of a millimeter can therefore be noted. If the variation in pressure become great enough to cause the meniscus to leave the capillary tube, that may be remedied by screwing or unscrewing the upper peg.

THE MOVING SIDEWALK AT CHICAGO. For those who come by the lake route, and for others who prefer to sail on land, there is the movable sidewalk, seating 40,000, and extending out on the great pier 2000 feet into the lake. The view of the grounds from the end of the pier is superb, and, as one can ride as long as the fancy dictates for one 5-cent fare, it is deservedly popular. The construction of the moving sidewalk with its endless chain of seats was not alone for fun, but fact, and to demonstrate its wonderful possibilities for the transportation of great masses of people. The line, which is operated by electricity, has a capacity of 240,000 passengers per hour. There are three endless platforms, forming a loop at each end. The first is stationary, the second moves at three miles an hour, and upon it one steps in a natural walk, but without experiencing any jar or shock; from this he steps to the third platform, moving three miles faster than the second, or at a total of six miles per hour. This third platform is entirely filled with cross seats. The moving platforms are carried on ordinary railway wheels and track, and constitute one of the most interesting attractions on the grounds.—Review of Reviews.

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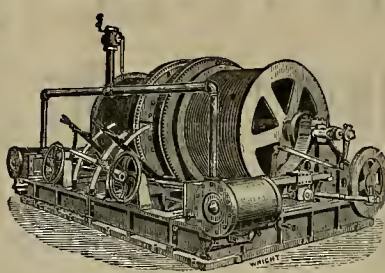
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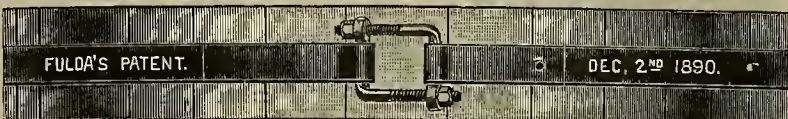
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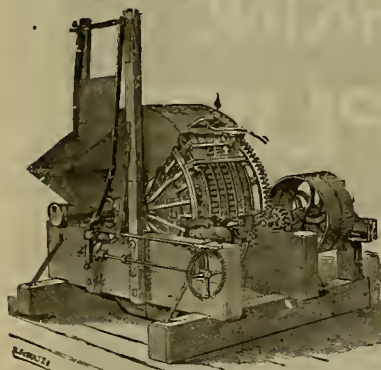
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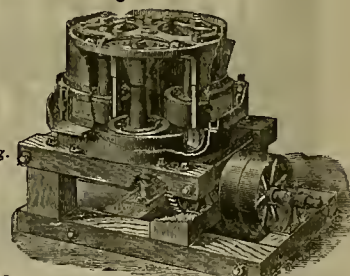
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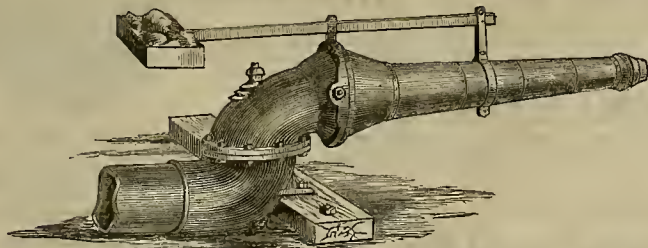
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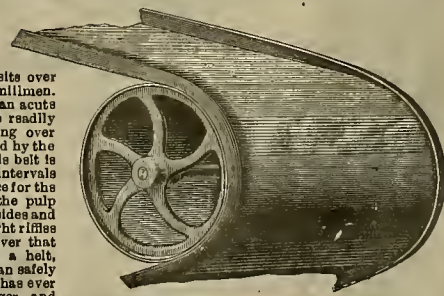


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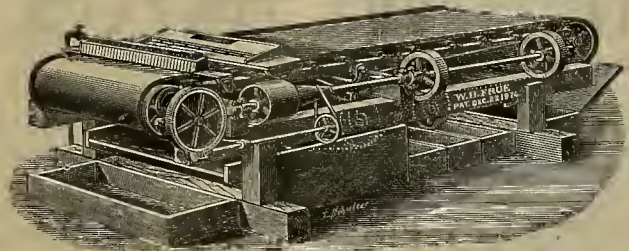


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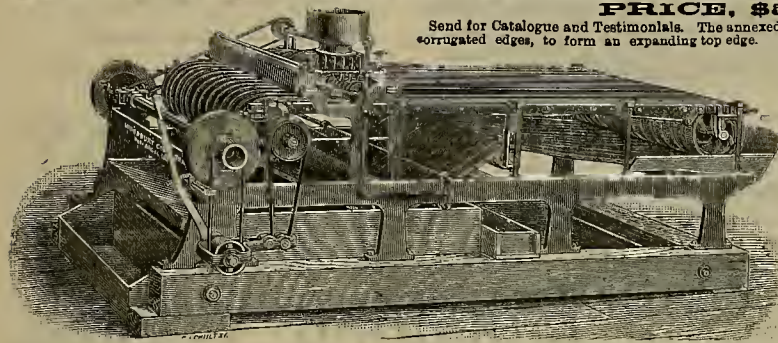
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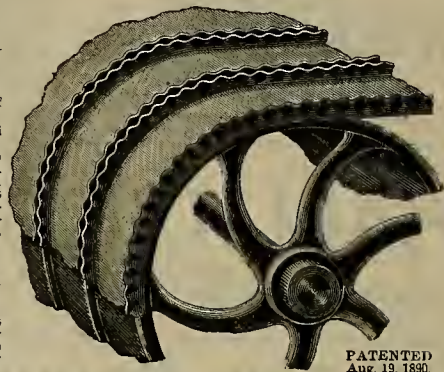
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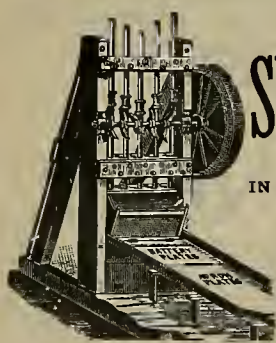
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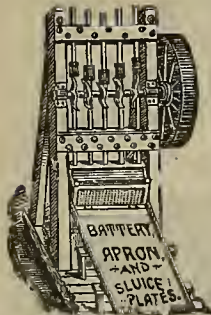
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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ASSAYS FROM THE BELL WETHER.—*Ledger*, June 16: An assay has just been made in San Francisco of some quartz taken from the Bell Wether mine of this place, owned by S. W. Bright. Ore taken from the south drift assayed \$3.50 per ton in free gold, while the sulphurets showed \$60; rock from the north drift assayed \$8, and the sulphurets \$78; from the crosscut \$12, and the sulphurets \$95, making an average of \$8 for the ore and \$75 for the sulphurets. These samples of rock were selected by San Francisco parties who are interested in the mine to the extent that they would like to purchase it, and are talking about it. The points in the north and south drifts from which samples were taken are about 200 feet apart. The average width of the ledge is from 35 to 40 feet. All who have examined it say it is the "biggest thing" ever struck in Amador county.

THE ARGONAUT.—Articles of incorporation of the Argonaut Mining Co. were filed in the county clerk's office last Monday, the incorporators being W. F. Detert, J. B. Francis, H. Eudy, B. Taylor and C. Berger. They are organizing a company with 200,000 shares of stock, at a par value of \$5, for the purpose of working the Pioneer property. The promoters of the company have already placed 200,000 shares and could place more if they desired. The proceeds are to be used in developing the property. It is probable that preparation for sinking a deep shaft will be made within 30 days.

THE BRIGHT MINE INCORPORATED.—The San Francisco parties who have bonded the Bright mine of Jackson have incorporated under the name of the Bright Mining and Milling Company, with G. W. Osborn as President, G. W. Osborn, Jr., as secretary, and P. H. Kane as treasurer. Three miners were put to work last Monday crosscutting on the surface. Superintendent A. V. Oliver will arrive this evening and immediately make a location for a shaft. This company means business and will thoroughly develop the property, with every indication of opening up a fine mine.

NOTES.—J. H. Tibbitts, superintendent of the Albany, remarked to a group of mining men in the National hotel the other evening that Jackson had a great mining future; that the dividends of the famous Kennedy were now attracting capitalists, and he believed that the time was near when, from the Kennedy to the Mokelumne river on the main contact, a line of hoisting works would be in operation and several good properties opened. At the Hardenberg the shaft is being advanced below the 600-foot level at the rate of 15 feet per week, with very encouraging prospects in the bottom. The water pipe of the old line from the Zeile reservoir to the mill is being taken up, and that which is of any value is being repaired and relaid. At the Albany both tunnels are being advanced across the country rock, with occasional stringers of quartz being cut, giving low assays. At the Farrell bids have just been closed for an additional 100 feet. The work was let to the original contractors. A fire was started Wednesday in the furnace of the Zeile chlorination works.

Butte.

THE GOLO BANK.—*Marysville Democrat*, June 10: Thursday last the Democrat mentioned the fact that W. W. Stow had on that day made proof and payment in the United Land Office on land embraced in the claim owned by him near Forbestown, known as the Gold Bank quartz mine. This property is located a short distance north of the Yuba county line, and about four miles from Brownsville. There are several other valuable mines located in this same range, among which is the R. C. mine near Brownsville, now being worked under the superintendency of J. C. Cambell. The Gold Bank mine is in charge of H. P. Stow, a son of W. W. Stow, of San Francisco, who is now having erected at Forbestown a fine residence which will cost several thousand dollars. Mr. Stow employs an average of 85 men in the conduct of the mine, and the wages paid are three dollars a day, the men receiving their pay every Saturday night if desired. Including lumber, labor, timber and wood, the sum expended monthly in the conduct of the Gold Bank mine is \$8000, which of itself is a big item in a small place like Forbestown. This mine is a very valuable piece of property, yielding, from one ledge, copper, silver and gold, the sulphates being treated by the roasting process to secure all of the precious metal. The mine at present, with its 20 stamps, produces not less than \$200 daily, or from \$35,000 to \$40,000 per month, with an apparent endless amount of gold-bearing quartz. The hoisting works and house were burned about two months ago, and were at once replaced with a better plant, and now, taking the whole work from the timbering of the incline to the plates for saving the gold, the roasting and assaying departments all present neatness and are composed of the latest and best to be had for the money. The Shakespeare mine near the Gold Bank is of about the same class of ore and is paying regularly. This mine, under the new management is being equipped with new and improved machinery, which, when completed, will, it is believed, cause an output equal in amount to that of the Gold Bank. There are other mines being worked in that vicinity and several prospecting for the precious metal, and in all there are probably 250 men employed.

El Dorado.

WILDMAN.—*Placer Herald*, June 17: The Wildman mine, formerly known as the Taylor mine, just across the river in El Dorado county, is paying big. Last month's cleanup was over a hundred pounds of clean amalgam. About 40 men are at work. The property is lighted throughout by electricity. Some handsome specimens have been taken lately from the Revenge mine, near Greenwood. This mine has been condemned for about five years. Those working it at present expect to strike something rich. The Wildman Mining Company, which recently purchased a claim from Ed Polifka and others situated on the American river, about two miles from Michigan Bluff, has completed the survey for a road from Georgetown to the

river. The company, we understand, will erect a 40-stamp mill.

Humboldt.

THE JANES CREEK MINE.—*Blue Lake Advocate*, June 13: If one may judge from appearances the outlook for development of the Anger Iron mine on Arcata bottom is bright. Mr. Charles Fulmore, who had some months ago secured a lease of the mineral land (a tract of 240 acres) for the purpose of developing it, has filed a relinquishment of it, and a few days ago Mr. Frank Morton, a representative of the Pittsburgh Iron Co., of Pennsylvania, after investigation of the vein of ore, leased, in the name of the company, 40 acres of land. It is announced that near the site of the Jolly Giant mill a smelter will be erected, so that the expense of shipment of ore to San Francisco may be obviated. The expectation is that work will go right on now in a satisfactory way.

ON THE KLAMATH.—*Blue Lake Advocate*, June 17: William Young, one of the stockholders in the Morick Hill mine, on the Klamath, has disposed of his interest to the rest of the company, as we learn from Mr. James Graham, who came down the first of the week from his ranch on Klamath Bluff. Mr. Graham tells us that the ditch for conveyance of water from Cappel creek has been completed, and that the force at present there are busy prospecting. The ditch, it seems, does not bring to the claim the volume of water needed, but if the result of their prospecting shall be satisfactory they expect to widen it or deepen it, or both. The circumstance that they have seen proper to buy Mr. Young's interest in the mine Mr. Graham is disposed to regard as an indication that they have faith in it. This mine was located three or four years ago by R. W. Miller, J. Lamb, William Young and a gentleman named Mulkey, but they soon discovered that they were too poor to do anything with it. They had a water privilege available ten months of the year, but to bring water four miles they found a big undertaking. Yet they kept on renewing until they had exhausted all their rights and then bonded mine and water right to A. B. Campbell, of Crescent City, and J. Miller, Mr. Hotchkiss and Mr. Guerne, of Healdsburg, with the understanding that they should have a specified time to put water on.

Mono.

NO MEN WANTED.—*Bodie Miner*, June 17: Several miners have been coming to Bodie lately from other camps. To those who have any intention of heading this way in the expectation of getting work, we will say that such a trip will be but a waste of time and money, as they will only meet with disappointment. Things at present are at a standstill, and when the Standard resumes operations there will be more than enough men right in town to make up the necessary force.

Nevada.

BONDED A MINE.—*Transcript*, June 12: R. R. Colgate, of Colgate & Co., the large toilet-soap manufacturers and perfumers of New York, who has been in this city several days, left for his home yesterday. During his stay here he obtained a bond on the Coan quartz mine, situated on Indian Flat, and arranged to have the same worked. A 7-inch pump will be put in at once, and the shaft sunk deeper. Work was begun this morning.

TO HYDRAULIC AT COLUMBIA HILL.—*Nevada Transcript*, June 17: It is currently reported today that the Eureka Lake and Yuba Canal Water and Mining Co. will next week apply for a license to resume work on its rich hydraulic mines at Columbia Hill. Disinterested parties who have examined the works are of the positive opinion that the Debris Commissioners will not hesitate to grant the license after they have thoroughly examined the works, as they are such that will strictly comply with the law. This famous mine has a magnificent impounding dam, and when it was worked, the water below the dam showed hardly any discoloration. By misrepresentation on the part of the valleties, the parties working the mine under a lease were enjoined. Rather than fight the valleties, they concluded to close down and wait until they could ask for a license from the Debris Commissioners. If a license is granted, the upper part of the county will soon resume some of its pristine glory, as it means the employment, directly and indirectly, of something like a hundred men. If the Eureka Lake Co. is granted a license, other companies will doubtless construct the proper dams and ask for a license. Should it be shown to the satisfaction of the Debris Commissioners that these mines can take care of their debris, the licenses will probably be granted. The starting up of three or four big hydraulic mines on the Ridge would give new life to that section and inaugurate an era of prosperity for the whole county. Said a gentleman to the *Transcript* reporter: "I cannot see how the Debris Commissioners, who are all fair men and will do their duty as they understand it, can refuse the Eureka Lake Co. the license which they will ask for, for everything has been done to comply with the Caminetti bill, and if that mine cannot be worked in its present condition, we cannot hope of ever seeing any more hydraulicking in this State."

Placer.

NOTES.—*Placer Herald*, June 17: The Mayflower is paying as well at the present time as it ever did before. The Sunny South and Paragon are paying exceedingly well. L. Remler, of Forest Hill, has commenced on his timber contract for the Sunny South mine. The Big Spring mine, adjoining the Dardanelles, is paying \$5 to \$6 to the pan. The Gray Eagle is still shut down. We understand it will be opened again soon. The World's Fair Mining Co., which has a mine just above Mammoth Bar, are about ready for work. They are getting out some heavy timbers to be used for the water-wheels. Work commenced Thursday at the French Hill claim one mile below Spanish Diggings, in Hoboken canyon.

Shasta.

LOWER SPRINGS.—*Cor. Shasta Courier*, June 17: Mr. Connors has made another big strike in one of his locations. The ledge is large, and, although not a color of gold could be seen in it, 40 pounds of the ore yielded \$3.50 when crushed in a hand mortar. The Mill, Gold Coin and Bonanza ledges are improving all the time, and are, as Mr. Connors says, bonanzas indeed. Spraggins is taking out some fine ore. The ledge is widening out, and Tom feels bigly pleased with the Sally Ann. The Bulkhead has been closed down. The owners will lay a

track and put in a car. The last rock taken out showed considerable free gold. The White Oak mines are still idle. Your correspondent was informed that Mr. Conant will dispose of them at auction before long. The Hartman Mining Co. is pushing work on its mill at Middle Creek.

CHLORINATING PLANT.—*Shasta Democrat*, June 21: The Gladstone Mining Co. is putting up a chlorinating plant at the mine, so we are informed. Al Donahue and partner, Mr. Vincent, yesterday sold a third interest in the Caledonian mine, near Churntown, to a gentleman named Nichols of San Francisco. We are informed that another milling plant, which will work custom ore, will soon be erected on Clear Creek, Igo. The machinery for the plant has been purchased, and men are at work excavating the mill-site. J. J. Kerneen has purchased the machinery of the Mad Ox mine, near Stella, formerly owned by J. B. Haggin of San Francisco, and will remove it to the Hidden Treasure mine on Iron Mountain, where he intends erecting a ten-stamp mill. C. E. Brown, secretary of the Miners' Association, spent several days last week in French Gulch district, collecting samples of ores for the mineral exhibit at the association's rooms. He and Major Lyons are building up a fine exhibit of Shasta county ores. Bell & Scranton have resumed work on the Summit mine at Sunny Hill, and have discovered another rich ore chute, from which they are taking shipping ore that averages \$600 a ton. They have shipped many thousands of dollars worth of ore from this mine in the past three years. We hear that Jim Campbell has struck a fine gold prospect high up on the mountain on the South Fork of Squaw Creek. It is a claim Jim has held for several years. He has run a short tunnel on the vein, which is four to five feet wide, and the quartz prospects way up in free gold. Jim is a rustler and hard worker, and deserves to find something good. Mr. Parker, the gentleman who has been developing the Crown Point mine on the southwest side of Muleton Mountain, is about to close a sale of his interest in the property to a Sacramento company for \$25,000. Mr. Parker expects the deal will be closed next week. He says the new company will immediately erect a milling plant on the mine. The Sacramento people who bought a mine from Ezra Thomas and paid \$5000 down two weeks ago, came up a few days ago and went out to the mine. The property is located on Pit river, above Copper City, about four miles from Brock's place. It is a claim a prospector named Norris located three years ago, and after doing some work on it abandoned it a year ago. Last fall Thomas went to the mine and discovered a big chimney of rich gold ore. Mr. Parker, of the Crown Point mine, placed the mine for Thomas. The ten-stamp mill on the Tellurium at Middle Creek is hammering away on ore from the Cleveland, and is doing good work. On account of the scarcity of water, the mill runs only during the day. Mr. Scherer is running a tunnel on the Schafer, also is driving ahead on the Tellurium and Cleveland. He is putting in a small plant to test the cyanide process for treating the Tellurium ore, and, if it proves the proper thing, a plant sufficient to handle the product of the mill will be put in.

Sierra.

RISING SUN.—*Mt. Messenger*, June 17: The Rising Sun Mining Co., near Allgaby, is preparing to put in an electric plant. The dynamo will be placed on the Middle Yuba to generate the power to be transmitted by wire to Kanaka Creek, about 2½ miles, where the mill will be built. Mr. Gifford of Los Angeles is up inspecting the Comet quartz mining property, situated in Jim Crow canyon. We learn that the chances are promising for the company he represents to take hold of this property and develop it. Some \$10,000 or \$12,000 will be expended.

Siskiyou.

BLUE GRAVEL.—*Yreka Journal*, June 21: The Greenhorn blue gravel mine is again at work. They have their splendid new pump at work, and it handles the water with ease. The old pump was too small for the volume of water that was entering the shaft at this season. The hoisting works have been remodeled and simplified and everything is put in fine shape. A large force of men will be put to work at once, and, if no unforeseen mishap occurs, the work will proceed without any interruption, as a large amount of gravel is now in sight that will pay well. It more than paid expenses in opening, and it will now pay a fine dividend. The middle or best paying part of the channel has not yet been reached. We understand that the company intends to sink a new shaft soon and put in a new hoisting plant soon and work it more extensively. There are a number of acres that are known to contain fine auriferous gravel that will pay handsomely for working. The old shaft, above the one at which they are at work now, paid more than \$20 a day to the man, but it caved in on them and they were obliged to abandon it. That same ground will soon be opened up again.

AT SAWYER'S BAR.—J. Sallee of Sawyer's Bar stopped over night in Yreka last night while en route to San Francisco. He had with him a fine lot of quartz and gold specimens. He and other parties had just recently discovered a fine ledge near Sawyer's Bar, and these specimens were taken from it. We understand that they panned out \$7500 around the ledge in one day. The results of mining are singular sometimes. Clark and Colson have been working what is known as the Uncle Sam mine on the Middle Fork of Humboldt, and, after going down some distance, the "pay quartz" disappeared, but work was continued. Last week they were about to shut down and quit work, as they thought it futile to continue work as there were no prospects of "pay"; but just then at a depth of 125 feet they opened a two-foot ledge of very rich quartz. Samples were shown at Judge Warren's office, and they were brilliant with gold. The mine is owned by San Francisco parties—Thomas Ager, Major Gillis and others. The samples of quartz exhibited here were sent to San Francisco to show what Humboldt could turn out. We expect to hear of many big finds in Humboldt before the summer is over.

Trinity.

FINE CLEAN-UP.—*Trinity Journal*, June 17: We learn from Wm. Vollmers, proprietor of the Trinity Center Hotel, who was in town this week, that a fine clean-up was made at the Strode mine last Saturday. From 30-bours' run with a cannon-ball mill, in which time four and a quarter tons of quartz were crushed 60 ounces were taken from the plates. The rest of the mill was not cleaned up. The mine

is about six miles from Trinity Center on Hostetter gulch. Mr. Strode has sunk on the ledge 230 feet. The ledge runs from 18 inches to 4 feet in width.

NEW RIVER NEWS.—We have just recovered from one of the severest winters known in the history of our camp. During the past two weeks the weather has been very beautiful. Clements & Ladd started a number of men to work at washing the Mountain Boomer mine about two weeks ago. They expect to realize thousands of dollars in a few months time this summer. They run down about 100 tons of dirt every day, which prospects from 75 cents to \$2.50 a ton. F. J. Ladd has five men engaged at taking out ore in the Toughnut. No doubt Mr. Ladd will keep his quartz mill, which he started to run yesterday, busy all summer and fall. Thos. Pharis of Eureka is running the Excelsior mill for Messrs. Leas and Nicholson. They had a large quantity of ore packed recently, which will keep the mill in motion quite a while. The Great English Consolidated Ridgeway Co. has failed to proceed with the necessary prospecting, or further development, which Mr. Stevenson, the San Francisco mining expert, advised them to do. We have heard through very good authority that Mr. Stevenson's general report of the Ridgeway ledge has been a very favorable one. Therefore, we fail to see why the company did not "appropriate" a few more thousand of Her Majesty's so-called royal pounds and sovereigns, and feel satisfied, without a doubt, that they were justified in abandoning the mine and mill. They have quit work without half completing the work which they knew, when they started, would be necessary for them to accomplish before they found a ledge. Miller and Son are quite busy washing the dumps on the Sherwood mine. They are also running their quartz mill and crushing custom rock at present. Yocum & Son are working the New Moon. They have just made a clean-up from that mine which we hear is quite satisfactory.

HYDRAULIC MINES.—*Shasta Democrat*, June 21: Mr. D. R. McCleary, one of the owners of the Bloss & McCleary hydraulic mine at Trinity Center, was in town a couple of days last week. He informed us that the French people who bought the Ward-Loverage mine at Weaverville are negotiating for the Bloss & McCleary mine. This is considered to be one of the best hydraulic mines on the coast. Jack Strode, of Whiskeytown, has the making of a promising mine on Hostetter gulch, four miles up the Trinity river from Trinity Center. Last week, from a 30-bours' run with a cannon-ball mill, crushing a little over four tons of ore, he cleaned up 60 ounces of amalgam from the plates. The rest of the mill was not cleaned up. Mr. Strode has sunk on the ledge 230 feet. It runs from 18 inches to 4 feet in width.

GOLO NOTES.—*Prescott Courier*, June 15: George Ridenour is in from his Delta mine, a short distance below Harlan's Camp, near Prescott. He brings with him some fine free-gold specimens. He has worked this mine for the past 12 years and made regular shipments of ore from it, the ore always holding well up to its average of 175 ounces silver and one ounce gold per ton. He has now 12 tons of ore on the dump. The pay streak is about 14 inches in width. The mine is developed by two tunnels of 90 feet each, one of 75 feet, three shafts, one of 60 feet, one of 56 feet and one of 45 feet. The fact of a man working one mine for 12 years with paying results speaks well for this vicinity as a mining section. Many a sack of gold dust and bar of bullion finds its way into Prescott, under cover of night and over obscure trails in the mountains, no public record of which is ever made. The reason of this secrecy is that miners fear to tempt the cupidity of men who might develop into highwaymen. Hence any accurate statement of our great gold output is impossible to get at. Every now and then the *Courier* accidentally runs on to a man who looks like he never had a dollar in his life, but who really is loaded down with gold bullion running into the thousands of dollars, and the invariable request is: "Please don't say anything about it." This is bad for the country, for only by making our riches known to the world will we prosper. G. W. Hull is in from Jerome, and says the general public have little idea of the extent of the great mines of the United Copper Co. at that point, which are among the largest, if not the largest, paying ore deposits known in the world. First theories were that the ore was a blanket deposit of no great depth, but after the workings of years, during which hundreds of feet have been sunk, there is now more rich ore in sight than ever. In fact, the workings are nearly all in ore. The mines offer a fine market for the products of the tributary ranches, and the prosperous and growing town of Jerome has sprung up around them.

NEW RIVER.—*Blue Lake Advocate*, June 13: Justice G. W. B. Yocum reached Blue Lake Saturday from the New River country. Our informant states that there are about 40 men in camp, and that the Sherwood, Excelsior, Toughnut and Boomer mines are in operation. The Toughnut in particular is accumulating some good ore. When the water gives out on the Boomer the force of men will be employed on the Hardtack. "Last year," remarked the Judge, "Hardtack people took out of the dump \$2000 in the space of two months, and five or six years ago the owners of the Hardtack took out some ore that assayed over \$80 a ton. You must understand that the New River mines are spotted. Sometimes one will strike a lead that pans out fine, and then again one will work a long time without results." Taken all around, the winter was severe at New River. Lots of snow fell in that country. There were ten feet of snow at the Mary Blaine mine when he came down, and he says he shouldn't be surprised if it is 40 or 50 feet in some places about the mine. A great deal of gold has been taken out of the Sherwood, Judge Yocum thinks, but how much money has been cleared is quite another question. The Ridgeway is not running. On Pony Creek, Uncle Steve Noble and sons have been at work and are doing quite well. The Judge himself is at work on a new claim which prospects well.

Yuba.

SMARTSVILLE IS WAITING.—*Marysville Democrat*, June 21: Representatives of the Democrat paid a flying visit to that once famed town, Smartsville, on last Sunday. They found the law-abiding citizens of that place at present living in hopes. They have, in conformity with the law, ceased all mining operations and now await patiently the action of the Caminetti Commission. It is the general opinion among the residents, young and old,

that the mines at Smartsville will be the very first to commence operations under the new law. Their claims are so situated that they can easily meet the provisions of the Act and carry on a legal system of mining—at least they feel confident that they can convince the Commission that they have the correct dumping-ground for the tailings that will result from the washing-down of the immense banks that now stand sentinel-like over Timbuctoo and Sucker Flat. If the hopes of these honest people are realized, Smartsville will again become the lively camp that it has been written in past years. The horny-fisted miner of the day and night shift will again seek his old haunts and Smartsville will boom. The father will again be seen to move from his humble cottage at early morn with lunch-bucket in hand, and, followed by an encouraging smile from a loving wife, enter into a lawful pursuit—so recognized by the Government. Smartsville at present contains many young men who have no steady occupation. With the new order of things they will be encouraged to habits of industry and enterprise; Smartsville will find new business houses springing up, with her young men at the helm. The deserted nooks about Sucker Flat and Timbuctoo will take on new life and the schools will require several more rows of desks, with an extra teacher or two. A railroad will connect the lively mining camp with Marysville and surrounding towns, and in a few years the surrounding country will not be recognized as the same. The perplexing question that has held this section at a standstill for a number of years will soon be decided, and Smartsville's visitors of last Sunday feel that the agitation has worked great benefits, so far as Smartsville is concerned.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, June 17: 1500 level—No advancement has been made during the week in the openings leading from the southwest drift, 75 feet above the sill floor of this level, but in working along the first part of the drift run west from the end of the southwest drift we have extracted a few tons of ore which assays \$21 per ton. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working west from the old stopes, on the third floor, operating through the upraise, No. 6 carried up from the main northwest drift. Also from the old stopes in working north from the crosscut run west from the northwest drift. The crosscut run east from the drift run south from the end of crosscut run east from a point 60 feet up in the upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 36 feet; total length 91 feet, continuing in porphyry and quartz showing some value. Have continued to extract some ore of average quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. The drift running south from this winze at a point 22 feet down has been extended 20 feet; total length 80 feet; showing some bunches of ore, and we are preparing to stop at this point. Have extracted during the week from all parts of the mine 277 cars of ore about 270 tons, the average assay value of which per car sample was \$36.20 per ton. Have shipped to the Morgan mill 91 1840-2000 tons. The mill is expected to commence crushing to-day, the 17th inst.

OPHIR—1565 level—The crosscut running east from the winze station on the sill floor of this level has been extended during the week 31 feet; total length 52 feet; continuing in a formation of porphyry, clay and quartz, which carries a low assay value. Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican company.

MEXICAN—On the 1565 level—West crosscut No. 2 from the north drift from east crosscut from the bottom of the winze, sunk from the 1455 level down to this level has been stopped. From this same north drift, at a point 409 feet in, an east crosscut was started and has been advanced 15 feet, in a porphyry formation. Have continued the work of making the necessary repairs in the shaft, being joint work with the Ophir company.

UTAH—340 level—The north drift from west crosscut No. 3, at a point 100 feet from its mouth, has been extended 14 feet; total length 21 feet; face in quartzite, clay and porphyry formation of very low assay value.

SIERRA NEVADA—The intermediate tunnel on Cedar Hill has been advanced during the week 16 feet, making the total length 402 feet; the face is in porphyry and streaks of quartz. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 20 feet, making the total distance west of the joint shaft 3267 feet; the face is in hard porphyry and small seams of quartz.

UNION SHAFT—The joint Sierra Nevada and Union west drift, 900 level has been advanced the past week 20 feet, making the total distance west of the shaft 3267 feet; the face is in hard porphyry and small seams of quartz.

ANDES—On 420 level, south drift from east crosscut No. 1 north, has been advanced 15 feet; total length 27 feet; formation quartz of very low value.

GOULD & CURRY—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 82 feet, passing through hard porphyry; total length 511 feet. Suro tunnel level—The joint east crosscut from northeast drift has been advanced 18 feet during the week; total length 26 feet; face in porphyry and vein matter.

BEST & BELCHER—200 level—West crosscut No. 2, started in northwest drift, 230 feet from our south line, has been advanced 12 feet, and work discontinued; total length 155 feet; face in hard porphyry. 900 level—The southwest drift started from west crosscut No. 3, 20 feet from top of upraise No. 1 from 1000 level, has been advanced 15 feet; total length 142 feet; face in hard porphyry. Suro tunnel level—The joint east crosscut from northeast drift has been advanced 18 feet during the week; total length 26 feet; face in porphyry and vein matter.

HALE & NORCROSS—On 900 level have completed repairs to the station and to-day started a new south drift, east of the ledge on this level. 1100 level—Are retimbering the main working station

preparatory to starting a new south drift on this level. 1800 level—Advanced the upraise in west crosscut on south boundary 9 feet; total height 75 feet. As it failed to show anything of value, work was stopped on it on the 13th inst. No further work will be done in this upraise. Main shaft—We continue retimbering above the 1300 level, and are repairing main incline where necessary.

POTOSI—The south drift, 35 feet west of the main shaft on the 850 level, is out 66 feet; face is in porphyry. The south drift 200 feet east of Potosi winze, 930 level, is out 43 feet, following four feet of low-grade quartz. The north drift, opposite the last-named drift, is out 125 feet; face in quartz and porphyry, some of which gives good assays. The raise from the north drift, 100 feet north of east crosscut, 930 level, is up 29 feet on the slope; the top shows two feet of good ore. The north raise from the 1000 level is connected with north drift on the 930 level, at a point 100 feet north of east crosscut opposite Potosi winze. In the north raise from the 1000 level, are opening a station 50 feet below the 930 level. The south stope is yielding the usual amount of fair-grade ore. Extracted and sent to the Nevada mill the past week 652 tons and 1500 pounds of ore from the 550, 1000 and 1150 levels. Milled during the week 670 tons. On hand at mill 163 tons and 250 pounds. Average battery assays, \$24.92; average car sample assays, \$28.72; shipped to the U. S. Mint, Carson, 377 pounds crude bullion.

CHOLLAR—Are making repairs to the drift on the 450 level, and repairing the station on the 850 level. The north drift from the east crosscut near the south line, 930 level, is out 54 feet, following a streak of clay and vein matter.

OCCIDENTAL—We continue to extract some ore of fair quality from the 650 level. The upraise from south drift, 650 level, is up 21 feet; top in quartz and porphyry. Crosscut No. 3 from Zedig drift, Suro tunnel level, has been extended 11 feet; face in quartz and porphyry.

Ferguson District.

CAMP NOTES.—*Pioche Record*, June 15: Four teams loaded ore from the April Fool Saturday. The Snowflake, owned by C. E. Goodrich and others, is looking well under development work. The Short mine, owned by Nesbitt Bros., is looking better as development progresses. Two men are working in it. Work on the Magnolia still goes on. They are sinking and drifting on the No. 1 shaft. It looks better now than it did six months ago. The Little Emma is looking better than it has for some time. The ledge is reported to be five feet wide. About 20 tons of high-grade ore is on the dump that will pay to ship. The ledge in the Monitor is 24 feet wide, and is said to carry clear across the face ore averaging 50 to the ton in gold. Teams are wanted to haul the ore to Millford. C. R. Crandall came in from Vanderhilt Sunday. He reports that place pretty lively. There are about 75 men working in New York and 25 in Vanderhilt districts. Potatoes are selling for five cents a pound and water for three cents per gallon. The bins at the April Fool are full of ore, and the boys are now piling the ore upon the dump. They would like to employ some teams, as they desire to make more shipments to Salt Lake. There are two carloads of ore now in the bins and plenty more in sight.

Silver Peak District.

MAY BE SOLD.—*Silver State*, June 16: An English company has in contemplation the purchase of a group of mines at Silver Peak, Esmeralda county. The price asked for the property is \$750,000, and if the sale is consummated it will require \$500,000 more to get water to the mines. It is hoped that satisfactory arrangements can be reached, as it will create new life in that section of the country.

White Horse District.

A RICH DISTRICT.—*Reno Gazette*, June 15: News from the White Horse mining district, eight miles north of Wadsworth, is very encouraging, all the assays reported going from \$100 to \$350 in gold, and there is much excitement. The ledge has been traced for a distance of four miles. The specimens shown by those who have visited the camp are very rich. Over 25 locations have already been made. The ledge is gold-bearing and promises to bring this section into prominent notice in a short time.

ALASKA.

BALD EAGLE GROUP.—*Juneau Record*, June 1: Mr. Keller, M. E., this week chartered the steamer Seoloin and took down men and supplies to commence work on the Bald Eagle group of claims at Sum Dum bay. A sale has been pending on these mines for some time past, but we are not informed whether such sale has been consummated yet or not. According to all reports it is a fine piece of property, and we would be glad to see a man with the reputation of Mr. Keller secure it. The company he represents has unlimited means, and, should they take hold of it, will open it up and undoubtedly place another paying mine to Alaska's credit. This would also entitle owners of other mining properties in that district to commence development work, and as there are a number of fine surface prospects showing, time and development ought to bring to light other valuable mines. Wm. M. Bennett will have his mill running in a short time on the Aurora mine, in Silver Bow basin. This property has made a good showing, and with a mill cannot fail to yield dividends.

ARIZONA.

A BIG STAMP MILL.—*Phoenix Gazette*, June 18: W. B. Gillingham, superintendent of the Phoenix mine, has returned from San Francisco and New York, where he went to purchase machinery for a 100-stamp mill to be erected on the mine. The mill was purchased from Frazer & Chalmers, of Chicago, and the iron and steel alone weigh 735,000 pounds. The material, including lumber and other material, consists of 150,000 pounds. Shipment of it will commence in about two weeks. A mammoth boiler and engine have also been procured, for the motive power will be steam for awhile. Later it is the intention of the company to have water power. Mr. Gillingham will leave for the mine with a large force of men to begin preparing the ground for the big stamp mill. It has always been a difficult matter to get machinery to reduce the ore of the Phoenix mine cheap enough to handle it profitably. The new Marshall mills were supposed to be just the thing, but were found inadequate and had to be discarded.

The latest improved stamp mill cannot very well be improved on, and, acting on his good judgment, Mr. Gillingham urged his company to purchase the material and at once erect a stamp mill that can treat enough ore at a time to run the profits up to a paying basis. It begins to look like the old mine would yet be operated successfully.

BRITISH COLUMBIA.

HYDRAULIC MINING.—*Nelson Miner*, June 10: Several stockholders of the Van Winkle Hydraulic Mining Co. were in Lytton last week, in expectation of seeing the first clean-up. There was not a sufficient volume of water, however, and the first wash-up will probably be witnessed this week. Among those in the party were J. M. Buxton, R. G. Tatlow, Edw. Mahon, Geo. DeWolf, H. E. Newton and Mining Engineer J. B. Hobson. The Van Winkle Co. has a subscribed capital of \$500,000, divided into 50,000 shares. They have constructed a ditch four miles in length and put in 3000 feet of 22-inch steel pipe, which gives them 375 feet head of water. One 8-inch monitor is ready for operation and a second one will be put in shortly. The dirt shows a good average, and when the present hydraulic apparatus is working it is estimated that 2500 yards can be easily worked in a day. The Lytton claim, immediately adjoining the Van Winkle, also shows every indication of wealth. A shaft is being sunk to a depth of 500 feet, and as high as \$5 in gold has been washed out of one cubic yard of dirt. Development work on this claim will be pushed forward during the summer. The Fraser, just across the river from the Van Winkle, is also a promising claim. Engineer Hobson has gone up to the Cariboo country to superintend the construction of hydraulic works on the Horsely placer claim, which is owned entirely by Canadian Pacific officials, Messrs. VanHorne and Abbott being largely interested.

THE SALMON RIVER CLAIMS.—J. Brigman, who has been spending a few days in Nelson, gives a very encouraging account of the outlook on the Salmon. Several hydraulic claims have been secured near the mouth of the Salmon river, and all of these give indications of becoming paying producers as soon as properly opened. Water is easily reached within a mile, and can be put on the ground very conveniently. Some Spokane capitalists have become interested with Mr. Brigman, and in conjunction with him they have purchased a portion of the Bates Bros.' claim, which will be needed in opening up their own ground. Careful prospecting has developed the fact that most of these claims will average from one cent per pan, and from the ease with which they can be worked will yield large returns. There is a large amount of ground along the river which was worked some 20 years ago, but abandoned owing to high prices for labor and supplies and lack of adequate means to work them properly. These can now be taken up and made to pay well. The coming summer will no doubt see a revival of placer and hydraulic work along the Salmon and its tributaries.

OREGON.

PROSPECTORS.—*Jacksonville Times*, June 16: Jackson and Josephine counties are still full of prospectors. Geo. Jensen, who is running a tunnel for the Jacksonville Milling and Mining Co., thinks that the main ledge will soon be struck. A. W. Sturges has 12 men employed at his extensive mines in Forest creek, and will make a clean-up by the 1st prox, which will astonish the natives. The Ashland Mining Co. has procured a Burleigh diamond drill to hasten operations in the bard rock in which they are now working, and will be in use after the first of July. Geo. Schump's ledge in Willows Springs precinct has been put in good shape and looks better than ever. Many of the placer-miners have finished for the season, but the majority are engaged in cleaning up or preparing to. The output of gold dust will be larger this season than it has been for many years past. Thos. Hammersley, of Gold Hill, who made an important discovery in Jump-off-Joe district, has sold half his ledge to Messrs. Lewis & Kinney, of Portland, for \$1000. They will develop it immediately. A very promising ledge has been discovered in Humboldt district by Henry D. Kubli and Ben. Thurston, and it promises to be a permanent vein. Some of the ore was sent to K. Kubli, and it certainly is among the richest we ever saw. Ore crushing will begin at the Fitch & Davis mine, called the Comstock of Oregon, before another month goes by, the machinery being already at the ground. The work of getting the mill up the mountain was immense, and several men were injured in the undertaking.

THE BAILEY BROS.' FIND.—*Bedrock Democrat*, June 12: The showing being made by the Mahel mine, Bailey Bros.' find, in the White Swan district, east of Baker City, is such as to warrant the statement that its equal in richness has never been found in the northwest, and in saying this the *Democrat* feels that it is even drawing the facts mildly. Since the discovery May 1st last, the mine has been in the course of development by the sinking of a shaft, and at this time the shaft is down over 40 feet, and, as well known to many mining men, the five-foot vein of ore continues all the way down and shows every evidence of permanency. Up to this time the amount of ore sacked during the progress of work will yield, as estimated conservatively by mining men, somewhere between \$50,000 and \$60,000, while on the dump the remainder of the ore will go \$100 to the ton. On Wednesday evening last, while sinking operations were in progress in the shaft and at a depth of 40 feet, a huge quartz howler in the bottom was run on to, and it became necessary to put in several "shots" to dislodge the deposit of ore. This was done, and when the smoke cleared away and the miners returned down the shaft, pieces of gold were scattered in every direction, and \$500 or more were picked up. The heavier pieces of quartz impregnated with gold were placed in sacks and piled with the already great accumulation of wealth awaiting mill reduction. Such a revelation of wealth is so astounding that it seems impossible of belief, but these are facts and are ready of substantiation. From the first mention of this find, the *Democrat* has been careful lest its readers might be suspicious of exaggeration, but the facts in this case cannot be overdrawn and have not in any particular in previous "write-ups" of the Bailey discovery. Its wealth in gold deposits is beyond comparison with anything of the kind ever discovered, and, if located in the State of Colorado, would bring 10,000 people to the scene in 60 days. Samples of the ore from the 40-foot depth in the shaft of the Mahel

mine can be seen on exhibition at the Baker City National Bank. The samples were brought in yesterday by Mr. Sam Baisley, and all of them show large quantities of gold. After the "shots," over 100 pounds of ore such as the pieces brought in were placed in the sacks, besides much more yet remaining when work for the day was stopped.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 13, 1893.

499,415.—CULTIVATOR—Cardinal & Love, Newcastle, Wash.
499,517.—CONDUCTOR'S INDICATOR—B. W. Carpenter, Hesper, Or.
499,524.—TREE SUPPORT—W. H. Cook, Riverside, Cal.
499,521.—ROOF-FRAMING RULE—A. G. Dahmer, Alameda, Cal.
499,287.—FOLDING BEDSTRA—J. A. Dewey, S. F.
499,524.—IRRIGATION APPARATUS—R. F. Dockery, Highland Park, Cal.
499,337.—BALLIST BOX—J. W. Erbes, Los Angeles, Cal.
499,288.—VEHICLE RUNNING GEAR—L. J. Ewell, S. F.
499,221.—BICYCLE TIRE—M. Friedberger, Stockton, Cal.
499,424.—RESAWING MACHINE—A. J. Haskell, S. F.
499,292.—MUSICAL TOY—Hauß & Dasha, S. F.
499,562.—PENCIL-HOLDER, ETC.—C. Kertell, S. F.
499,293.—FARMING IMPLEMENT—M. Ma lead, Los Angeles, Cal.
499,436.—BLACKING BRUSH, ETC.—J. S. Moore, Portland, Or.
499,631.—BICYCLE ATTACHMENT—I. Polhamus, San Diego, Cal.
499,441.—CARD CATALOGUE—A. J. Rudolph, S. F.
499,442.—BOOK INDEX AND FILE—A. J. Rudolph, S. F.
499,443.—FILE OR INDEX—A. J. Rudolph, S. F.
499,615.—SPRING SNAP—E. N. Walker, Lakewood, Or.
499,269.—WATER MOTOR—W. R. White, Seattle, Wash.
499,491.—CAR COUPLING—W. B. Yates, Bucoda, Wash.
23,640.—DESIGN FOR LAMP STOVES—J. F. Myers, S. F.

The following brief list by telegraph, for June 20, will appear more complete on receipt of mail advices:

California—James C. Wood, Los Angeles, bed lounge; James A. Lighthouse, San Francisco, coin machine; Bernard W. McKenzie, San Diego, hose-fastener; Isaac S. Goldman, Los Angeles, hose band; James H. Jones, San Francisco, rotary fan; Francis S. Jerome, San Francisco, trunk; Milton A. Wheaton, San Francisco, can-heading machine; Richard N. Brooks, San Francisco, rotating index; Lewis Peterson, San Francisco, advertising machine; Norton H. Pine, Eureka, rope-leader for winding drums; Arthur Reynolds, San Francisco, animal shears; Juan F. Santellana, San Francisco, leveling and measuring telemeter; James C. Wood, Los Angeles, bed chair; John M. Finch, Marysville, separator; Ellis A. Mosser and E. J. Cox, Riverside, ladder; August Fitch, Los Angeles, reversible plow; Frederick O. Norton, Oroville, secondary battery; Charles L. Logan, Los Angeles, fare register.

Oregon—Owen H. Dabney, Salem, cane stool; Carl M. Kardell, Marshfield, saw-setting device; Carl Hoffman, Roseburg, receptacle for growing plants.

Washington—Alfred Williams, Seattle, filter; Geo. N. Peck, Tacoma, school seat and desk; Richard Nash, Tacoma, car coupling.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, June 22 1893.

9:30 A. M. SESSION.	
100 Alpha.....	150 100
200 Alta.....	150 400
400 Belcher.....	1.05 200 Mexican.....
50 Best & Belcher.....	500 250
400 Bodie.....	230 200 Occidental.....
800 Bullion.....	40 500 Optic.....
100 Challenge.....	250 100
500 Chollar.....	700 1400 Overman.....
200.....	750 1600 Potosi.....
100 Con. Cal. & Va.....	1.70 500 Savage.....
250.....	1.65 500 Sierra Nevada.....
100 Gould & Curry.....	650 50 Union.....
200 Grand Prize.....	50 1300 Yellow Jacket.....
300 Hale & Norcross.....	450
2:30 P. M. SESSION.	
400 Mexican.....	1.05 50 Alpha.....
200 Alta.....	1.00 350 Belcher.....
100 Best & Belcher.....	850 100 Confidence.....
200 Gould & Curry.....	600 100 Sierra Nevada.....
150 Savage.....	500 650 Overman.....
1050 Chollar.....	650 60 Justice.....
100 Potosi.....	1.45 1000 Savage.....
100.....	1.40 100 Union.....
150 H & N.....	450 100 Challenge.....
100 Crown Point.....	50 400 Andes.....
100.....	500 250 Occidental.....
100 Yellow Jacket.....	1.35 100 Bullion.....
550 Kentuck.....	200

Mining Share Market.

Although the last weekly reports from the Comstock mines are quite encouraging in their nature, especially with regard to the Middle and North End mines, they have not had much effect on the prices. There seems to be little interest in the market, what attention there is given to it being upon a few mines. In most of them the transactions are comparatively light.

Ore shipments of 500 or 600 tons of gold-bearing rock have been made from the Crown Point to Mexican mill, to make a test run of the Frue concentrators recently put in at the mill. The rock is of low grade, and if the test is satisfactory more rock of the same class will be worked. At the Potosi the bunches of ore continue to look well. Ore shipments to the Nevada mill have been increased and the company should be able to work out of debt in a very short time, as the grade of ore is better, and with the air connection made the ventilation will be so improved that a greater quantity of ore can be extracted without increasing the expense.

At the annual meeting of the stockholders of the Bodie Con. 54,512 shares were represented and the following officers were elected for the ensuing year: H. D. Walker, president; L. Osborn, vice-president; and A. Herrmann, W. H. King, R. H. Sinton, E. P. Danforth and John W. Kelly, directors. M. E. Willis was elected secretary and John W. Kelly, superintendent. The secretary's financial statement showed a credit of \$9061.41.

A review of the milling work of the Standard mine at Bodie is given in another column, and will be found of interest to millmen who are banding ores, concentrates or tailings.

Market Reports.

The Markets.

SAN FRANCISCO, June 22, 1893.

The Metals.

Tin has continued to manifest strength during the week and has steadily advanced. Copper is weaker. There is no change in lead.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	@ 14	English, lb.	@ 18
BORAX.		Canton tool.	@ 8 1/2
Refined, in car lots	@ 7 1/2	Bl'k Diam'd tool	8 1/2 @ 15
Powdered, do.	@ 7	Pick & Hammer.	1/4 @ 10
Concentrated, do.	@ 6 1/2	Machinery.	4 @ 5
All grades jobbing at advance.		Toe Calk.	@ 4 1/2
COPPER.		TIN PLATE.	
Bolt.	22 @	B. V. steel grade	@ 5 8 1/2
Sheeting.	22 @	1/2 x 20, spot.	@ 5 8 1/2
Logot, jobbing.	@ 13 1/2	Charcoal, 14x20.	@ 5 8 1/2
Do, wholesale.	@ 13	Do roofing, 14x20.	@ 5 8 1/2
Fire Box Sheets.	22 @ 24	Do, do, 20x28.	@ 11 7 1/2
IRON.		PIG TIN.	
Bar, base.	@ 3	Spot	@ 24
Norway, base.	@ 4 1/2	Spot	@ 24
PIO IRON.		COAL.	
Eglinton 20 ton.	20 @ 00 1/2	SPOT FROM YARD—PER TON.	
Gleagard.	21 @ 00 1/2	Wetliff.	\$8 00
Am. No. 1.	22 @ 00 1/2	Greta.	7 50
Shots No 1.	22 @ 00 1/2	Nasalm.	6 50
Puget Sound.	20 @ 00 1/2	Gilman.	8 00
Clay Lane White.	21 @ 00 1/2	Seattle.	8 50
Langdon.	22 @ 00 1/2	Ocoee Bay.	8 50
Gartbarrie.	22 @ 00 1/2	Cannel.	8 50
Barrow.	22 @ 00 1/2	Egg hard.	12 00
Caradoc.	22 @ 00 1/2	Walland.	7 25
CHROME IRON ORE.		Scotch Split.	8 00
Per ton.	19 @ 00 1/2	Brynia.	7 50
LEAD.		West Hartley.	8 00
Pig.	@ 4 1/2	TO LOAD—PER TON.	
Bar.	@ 5 1/2	Australan.	6 37 1/2
Shot.	@ 6 1/2	Liverpool Steam.	8 50 1/2
Pipe.	@ 7 1/2	Scotch Split.	8 00
SHORT.		Cardiff.	6 1/2
Drop, sizes smaller than		Lehigh Lump.	11 00 1/2
B, 1/2 bag of 25 lbs.	\$1 80	Cumberland.	12 00 1/2
Do do, B and larger sizes		Egg, hard.	10 00 1/2
1/2 bag of 25 lbs.	2 00	West Hartley.	7 50 1/2
Buck, Balls and Chilled		COKE.	
do, 1/2 bag of 25 lbs.	2 00	English, to load.	\$9 60 @ 10 00
QUICKSILVER.		Do, spot, in bulk.	@ 10 00
Home trade, pr.		Do, in sacks.	@ 11 50
do.	42 @ 43 00	Cumberland.	9 50 @

Copper Trade.

Henry R. Merton & Co. report the stock of Copper in England and France and afloat thereto from Australia and Chili on the 1st of June, as follows:

	Price.	Tons.
1891.	£55 5s od	58,258
1892.	46 7 6	53,065
1893.	43 2 6	49,951

The exports of Copper from New York for the first four months of the year were 11,618 tons matte and 11,351,800 lbs. refined, valued at \$24,426,900. On the 10th Copper was quoted in London at £44 7s 6d.

Sales of Silver.

There were only two offers to sell Silver to the Government on the 12th. One of these was at \$3.60 and the other at \$3.39. The acting Director of the Mint thought there was too much difference between the two proposals, and made and offer of \$3.40. He secured 368,000 ounces at that figure, which is 6-10 below the London parity. Fine Silver is now 38 1/2 d in London, an advance of 1/2 d since the 1st inst. The improved price is the result of

lessened offerings. The demand, both at home and abroad, shows no improvement. Some mines, however, have been closed, and others are yielding less than formerly.

Silver on the Block.

Secretary Morton, according to the New York Post's Washington correspondent, since his return from the West has urged upon Secretary Carlisle the expediency of selling a lot of our store of pig silver for what we can get for it and turning the proceeds into the treasury. Carlisle responds that there is no law under which he could make such sales.

NEW YORK, June 21.—Following are the closing prices for the week:

	Silver in—	Copper.	Lead.	Tin.
Thursday	38 1/2	83 1/2	10 60	3 70
Friday	38 1/2	83 1/2	10 60	3 62 1/2
Saturday	38 1/2	83	10 60	3 62 1/2
Monday	38 1/2	83 1/2	10 65	3 60
Tuesday	38 1/2	82 1/2	10 65	3 60
Wednesday	38 1/2	82 1/2	10 65	3 60

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS. ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ.	TAXES.	SECRETARY.
Ada Cons M Co, Utah.	11	100	May 10, June 10, July 6.	J H Cripps, Salt Lake City		
Alpha Cons M Co, Nevada.	11	100	May 10, June 14, July 6.	O E Elliott, 309 Montgomery		
Alma M Co, Nev.	43	150	April 25, June 21, July 12.	L Osborn, 308 Montgomery		
Best & Belcher M Co, Nevada.	54	250	June 6, July 14, August 4.	L Osborn, 309 Montgomery		
Cons New York M Co, Nevada.	10	100	May 12, June 16, July 10.	C E Elliott, 309 Montgomery		
Cons St Gothard M Co, California.	8	80	May 11, June 15, July 8.	T Wetzel, 330 Sansome		
Crocker M Co, Arizona.	14	50	June 8, July 13, August 3.	A Waterman, 309 Montgomery		
Deer Creek M Co, Nevada.	61	250	June 12, July 18, August 8.	J Newland, Mills Bldg		
Derby Blue Gravel M Co, California.	11	50	May 31, July 5, July 27.	C E Elliott, 309 Montgomery		
Eclipse M Co, California.	4	20	May 11, June 12, July 3.	T Wetzel, 330 Sansome		
El Leopoldo M Co, M. 1100.	3	50	May 25, July 1, July 20.	Jabez Howe, 214 Pine		
Hale & Norcross S M Co, Nevada.	101	500	June 21, July 29, Aug 18.	A B Thompson, 309 Montgomery		
Imperial M Co, Nevada.	54	100	May 27, June 29, July 20.	W W Sargent, Mills Bldg		
Judson M Co, Nevada.	54	100	May 15, June 18, July 7.	E E Kelly, 308 Montgomery		
Lady Washington Cons M Co, Nevada.	8	100	April 18, May 23, July 11.	L Osborn, 309 Montgomery		
Peer M Co, Arizona.	15	50	June 8, July 12, August 5.	A Waterman, 309 Montgomery		
Peerless M Co, Arizona.	20	50	June 15, July 20, Aug 10.	A Waterman, 309 Montgomery		
Red Jacket Cons M Co, Nevada.	1	50	May 24, July 15, August 5.	S M Capp, 415 Montgomery		
Savage M Co, Nevada.	81	250	June 20, July 25, Aug 14.	B Holmes, 309 Montgomery		
Silver Hill M Co, Nevada.	33	50	May 29, July 5, July 28.	D C Bates, 309 Montgomery		
Utah Cons M Co, Nevada.	18	100	June 16, July 18, Aug 5.	A W Havens, 309 Montgomery		
Valencuela M Co, Mexico.	1	10	May 5, June 8, June 25.	A E Bull, 421 California		
Weldon M Co, Arizona.	7	50	June 15, July 16, Aug 9.	A Waterman, 309 Montgomery		

MEETINGS.

MEETING. SECRETARY AND OFFICE IN S. F. DATE.
Annual. J. W. Pew, 310 Pine St. June 28
Annual. F. H. Andross, 324 Pine St. June 28

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California.	10	T Wetzel, 310 Pine.	May 15
Cons New York M Co, Nevada.	10	O E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co.	10	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California.	10	D M Knott, 330 Pine	May 15
Pacific Coast Borax Co, California.	1 00	A H O'Leary, 230 Montgomery	Jan 10
Standard Cons M Co, California.	10	J W Pew, 310 Pine.	July 25

BARGAINS IN SECOND - HAND MACHINERY.

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ONE 3-H. P. VERTICAL ENGINE.
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ONE 6x12 EVANS DEEP WELL STEAM PUMP, with 4-inch double-acting cylinder, 100 feet of pipe and well rods, all fitted.
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SAN FRANCISCO SAVINGS UNION,
536 California Street, corner Pansome.
Branch, 1700 Market Street, corner Polk.

For the half year ending with 30th of June, 1893, a dividend has been declared at the rate of five (5) per cent per annum on Term Deposits and four and one-sixth (4 1/6) per cent per annum on Ordinary Deposits, free of taxes, payable on and after Saturday, July 1, 1893.
LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

THE GERMAN SAVINGS & LOAN SOCIETY
526 California Street.

For the half year ending June 30, 1893, a dividend has been declared at the rate of five and one-tenth (5 1/10) per cent per annum on Term Deposits, and four and one-quarter (4 1/4) per cent per annum on Ordinary Deposits, payable on and after Saturday, July 1, 1893.
GEO. TOLNEY, Secretary.

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